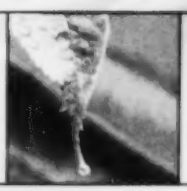
report on
implementation progress of

water for life



alberta's strategy for sustainability

october 2005

Alberta

Alberta Environment
Main Floor, Oxbridge Place
9820 – 106 Street
Edmonton, AB T5K 2J6
Tel: 780.427.2700
Fax: 780.422.4086
E-mail: waterforlife@gov.ab.ca
Website: www.waterforlife.gov.ab.ca

For more information about
Water for Life, or to learn more about
what you can do to get involved, visit
www.waterforlife.gov.ab.ca or
call 780.427.2700 (call toll-free in
Alberta by first dialing 310.0000).

ISBN No. 0-7785-4376-5 Pub No. I/1006

106-02169/

» water for life highlights 5
» key initiatives undertaken in 2004/2005 5

1.0 introduction 6
1.1 Implementation Progress Overview 6
1.2 Report Purpose and Format 8

2.0 safe, secure drinking water supply 9
2.1 Key Program Initiatives 11
2.1.1 Assessment of Drinking Water Facilities 11
2.1.2 Source-to-Tap/Multi-Barrier Approach 12
2.1.3 Municipal and Regional Water/Sewer Systems 14
2.1.4 Provincial Park Water Supplies 15
2.2 Performance Measures 15
2.3 Additional Information 16

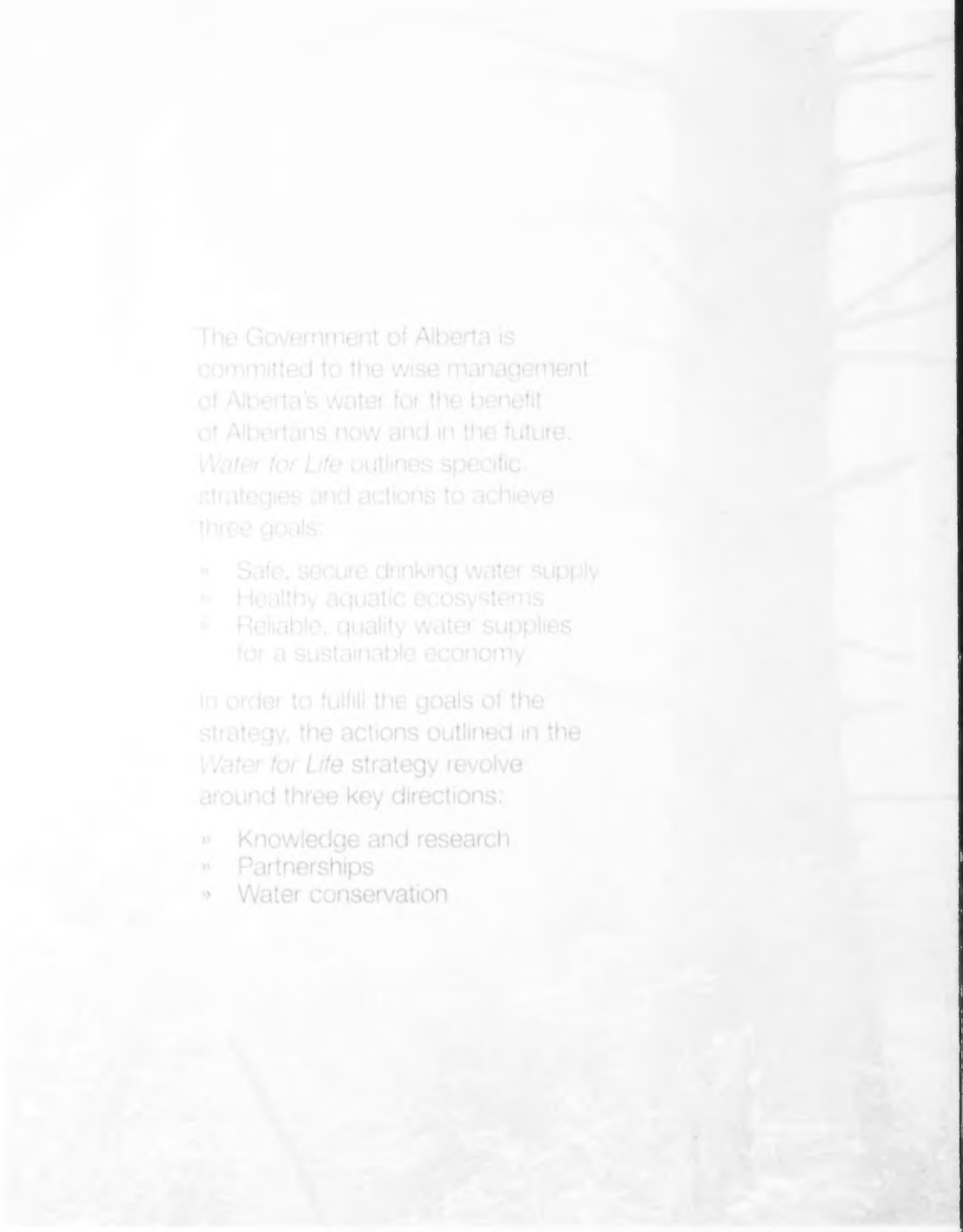
3.0 healthy aquatic ecosystems 17
3.1 Key Program Initiatives 19
3.1.1 Initial Assessment of Aquatic Ecosystem Health 19
3.1.2 Decision Support Tools for All Watersheds 20
3.1.3 Methods for Monitoring and Assessing Aquatic Ecosystem Health 20
3.1.4 Aquatic Ecosystem Reporting 21
3.1.5 Wetland Inventory and Policy 21
3.1.6 Provincial- and Basin-scale Ecosystem Objectives 22
3.2 Performance Measures 22
3.3 Additional Information 23

4.0 reliable, quality water supplies for a sustainable economy 24
4.1 Key Program Initiatives 26
4.1.1 Full Cost of Providing Water 27
4.1.2 Water Allocation Transfers 27
4.1.3 Transboundary Agreements 28
4.1.4 Manage Water Resources in Accordance with the *Water Act* 30
4.1.5 Water Management Infrastructure Assessment 30
4.1.6 Water Management Infrastructure Maintenance 31
4.2 Performance Measures 31
4.3 Additional Information 31

32
5.1 Key Program Initiatives 34
5.1.1 Provincial Water Research Plan 35
5.1.2 Provincial, Multi-disciplinary Water Research Centre 35
5.1.3 Alberta Water Information Centre 36
5.1.4 Surface Water Quality Assessment and Planning 36
5.1.5 State of Quality and Quantity of Surface Water Supplies 37
5.1.6 State of Quality and Quantity of Groundwater Supplies 37
5.1.7 Policies and Tools to Enhance Water Management 38
5.1.8 Flood Risk Maps and Warning Systems 38
5.1.9 Drought Monitoring and Information 39
5.1.10 Education and Outreach 39
5.2 Performance Measures 40
5.3 Additional Information 40

41
6.1 Key Program Initiatives 43
6.1.1 Framework for Partnerships and Watershed Planning 43
6.1.2 Alberta Water Council 43
6.1.3 Watershed Planning and Advisory Councils 44
6.1.4 Watershed Stewardship Groups 45
6.1.5 Watershed Planning 46
6.2 Performance Measures 46
6.3 Additional Information 46

47
7.1 Key Program Initiatives 49
7.1.1 Water Use Data System 49
7.1.2 Education Program on Water Conservation 50
7.1.3 Value of Water In Relation to the Provincial Economy 51
7.1.4 Analysis of Economic Instruments and Water Conservation Measures 51
7.1.5 Water Use Practice and Policy for Various Sectors 51
7.1.6 Implementing Best Management Practices for Agriculture 52
7.2 Performance Measures 52
7.3 Additional Information 52

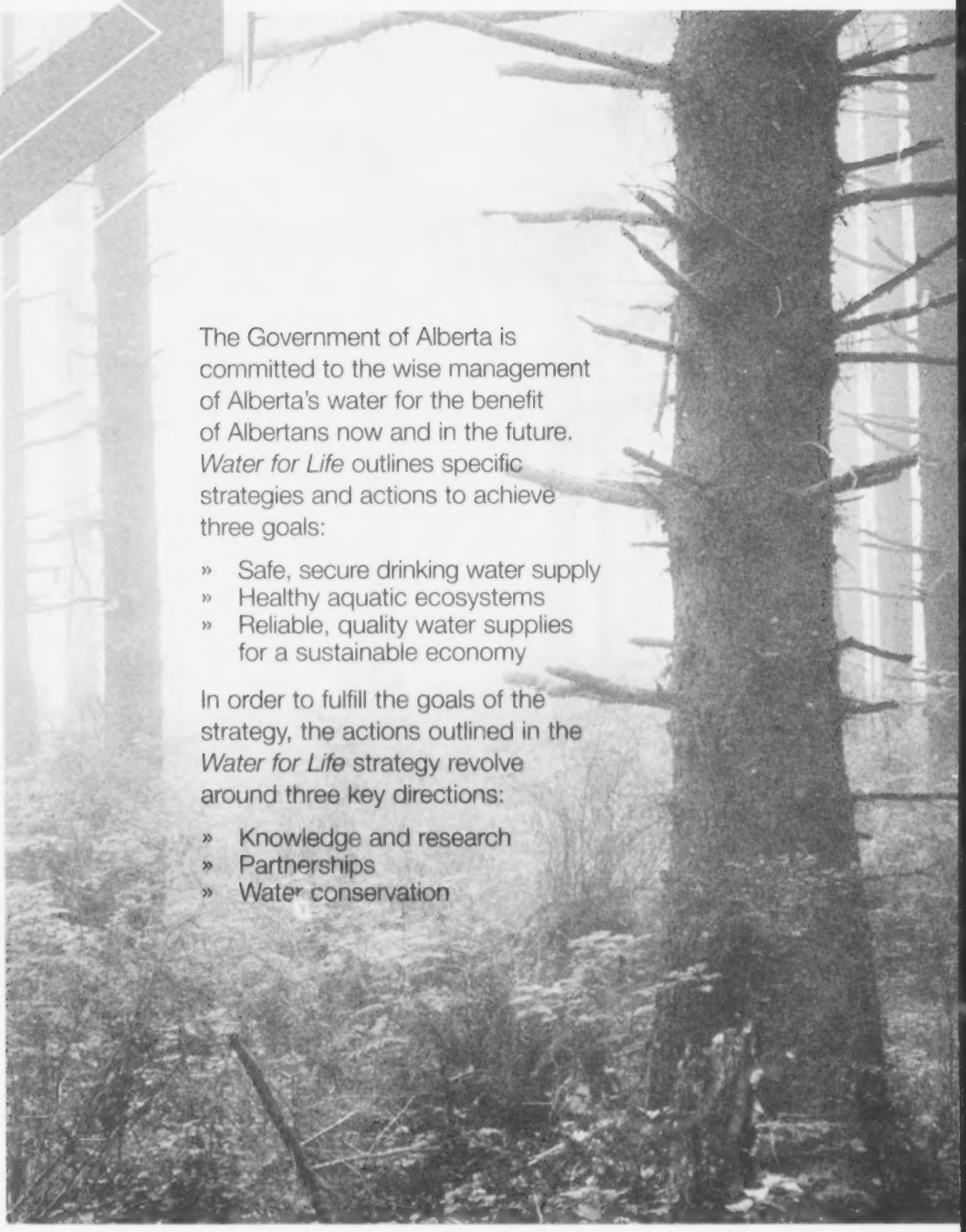


The Government of Alberta is committed to the wise management of Alberta's water for the benefit of Albertans now and in the future. *Water for Life* outlines specific strategies and actions to achieve three goals:

- Safe, secure drinking water supply
- Healthy aquatic ecosystems
- Reliable, quality water supplies for a sustainable economy

In order to fulfill the goals of the strategy, the actions outlined in the *Water for Life* strategy revolve around three key directions:

- Knowledge and research
- Partnerships
- Water conservation



The Government of Alberta is committed to the wise management of Alberta's water for the benefit of Albertans now and in the future. *Water for Life* outlines specific strategies and actions to achieve three goals:

- Safe, secure drinking water supply
- Healthy aquatic ecosystems
- Reliable, quality water supplies for a sustainable economy

In order to fulfill the goals of the strategy, the actions outlined in the *Water for Life* strategy revolve around three key directions:

- Knowledge and research
- Partnerships
- Water conservation

Water for life: highlights

The Government of Alberta, in consultation with the public, developed *Water for Life: Alberta's Strategy for Sustainability* to define a new collaborative framework for water management in Alberta.

The strategy identifies short-, medium- and long-term actions to achieve three goals: safe, secure drinking water supply; healthy aquatic ecosystems; and reliable, quality water supplies for a sustainable economy.

The strategy emphasizes actions in three key areas: knowledge and research; partnerships for watershed management and stewardship; and water conservation.

The strategy includes objectives and actions for the next 10 to 12 years. Each year will see new projects initiated, components completed, and progress on multi-year components.

Implementation of the strategy began in 2004-2005, with Alberta Environment and other partnering ministries taking action in a number of areas to build a foundation for the ongoing work of the initiative. Five million dollars was assigned to "new" operational initiatives, and $14 million was assigned to capital initiatives.

Alberta Environment will continue to lead implementation of *Water for Life* and work collaboratively with other ministries and stakeholders to achieve Water Strategy outcomes. A Cross-Ministry Steering Committee is established to oversee government implementation.

Although implementation of the Water Strategy will involve many partners, the Government of Alberta remains accountable for the results and outcomes of policy, regulations, and decisions. As part of the process, specific performance measures are being established. To date, performance measures remain preliminary. Additional measures and enhancements to existing measures will be developed in partnership with the Alberta Water Council as part of the implementation of specific Water Strategy actions.

key initiatives undertaken in 2004/2005

The formation of the Alberta Water Council and the development of Watershed Planning and Advisory Councils form the foundation for advancing water management objectives through partnerships. These councils, along with Watershed Stewardship Groups, will make recommendations to government, stakeholders and the public on improving water management throughout Alberta's watersheds.

Other key initiatives undertaken this year include: an assessment of drinking water facilities across the province; the enhancement of water monitoring programs; a review of water storage sites; an examination of protocols to reduce the amount of fresh water used in oilfield injection; the development of the Alberta Water Information Centre; and the development of an electronic water use reporting system.

For further information on this report, please call 780.427.2700
or e-mail waterforlife@gov.ab.ca.

Water for Life: Alberta's Strategy for Sustainability is Alberta's commitment to the wise management of water now and into the future. The Water Strategy outlines a new framework for water management in Alberta, shifting to a shared responsibility or stewardship approach, to achieve three major outcomes:

- safe, secure drinking water supply;
- healthy aquatic ecosystems; and
- reliable, quality water supplies for a sustainable economy.

The Water Strategy emphasizes actions in three key areas:

- knowledge and research;
- partnerships for watershed management and stewardship; and
- water conservation.

With the release of *Water for Life* in November 2003, the roles of government and stakeholders shifted from policy development to implementation. The Water Strategy includes objectives and actions for the next 10 to 12 years. Each year will see new projects initiated, components completed, and progress on multi-year components.

Alberta Environment worked closely with other ministries, other levels of government, industry, non-government organizations, the public, and other stakeholders to implement Water Strategy initiatives in 2004-2005. Five million dollars was assigned to "new" operational initiatives, and $14 million was assigned to capital initiatives. This funding is in addition to the funding allocated from ministries' core operational and capital budgets to manage water in Alberta.

This year's implementation focused on providing a strong foundation to enhance current and future actions in water management. The formation of the Alberta Water Council and the development of Watershed Planning and Advisory Councils form the foundation for advancing water management programs through partnerships. Other key programs undertaken this year include: an assessment of drinking water facilities across the province; the enhancement of water monitoring programs; a review of water storage sites; an examination of protocols to reduce the amount of fresh water used in oilfield injection; the development of the Alberta Water Information Centre; and the development of an electronic water use reporting system. The following table summarizes the initiatives implemented in 2004-2005 and identifies the key ministries responsible for implementation.

Water for Life – Implementation in 2004-2005

Program Initiative	Ministry
SAFE, SECURE DRINKING WATER SUPPLY:	
Assessment of drinking water facilities	AENV
Operations support for approved drinking water systems	AENV
Alternate program — laboratory data quality assurance	AENV
Municipal and regional water/sewer systems	AIT
Provincial park water supplies	CD
HEALTHY AQUATIC ECOSYSTEMS:	
Initial assessment of aquatic ecosystem health	AENV, SRD
Decision support tools for all watersheds	AENV, SRD
Methods to monitor & assess aquatic ecosystem health	AENV, SRD
RELIABLE, QUALITY WATER SUPPLIES FOR A SUSTAINABLE ECONOMY:	
Water allocation transfers	AENV
Transboundary agreements	AENV
Manage water resources in accordance with the Water Act	AENV
Water management infrastructure assessment	AENV
Water management infrastructure maintenance	AENV
KNOWLEDGE AND RESEARCH:	
Alberta Water Information Centre	AENV
Surface water quality assessment and planning	AAFRD, AENV, SRD
State of quality and quantity of surface water supplies	AENV
State of quality and quantity of groundwater supplies	AENV
Flood risk maps and warning systems	AENV
Drought monitoring and information	AAFRD
Education and outreach	All
PARTNERSHIPS:	
Framework for partnerships and watershed planning	AENV
Alberta Water Council	AAFRD, AENV, ED, Energy, HW, SRD
Watershed Planning and Advisory Councils	AAFRD, AENV, SRD
Watershed Stewardship Groups	AAFRD, AENV
WATER CONSERVATION:	
Water use data system	AAFRD, AENV, EUB
Education program on water conservation	All
Water use practice and policy for various sectors	AAFRD, AENV, Energy, EUB

Note:

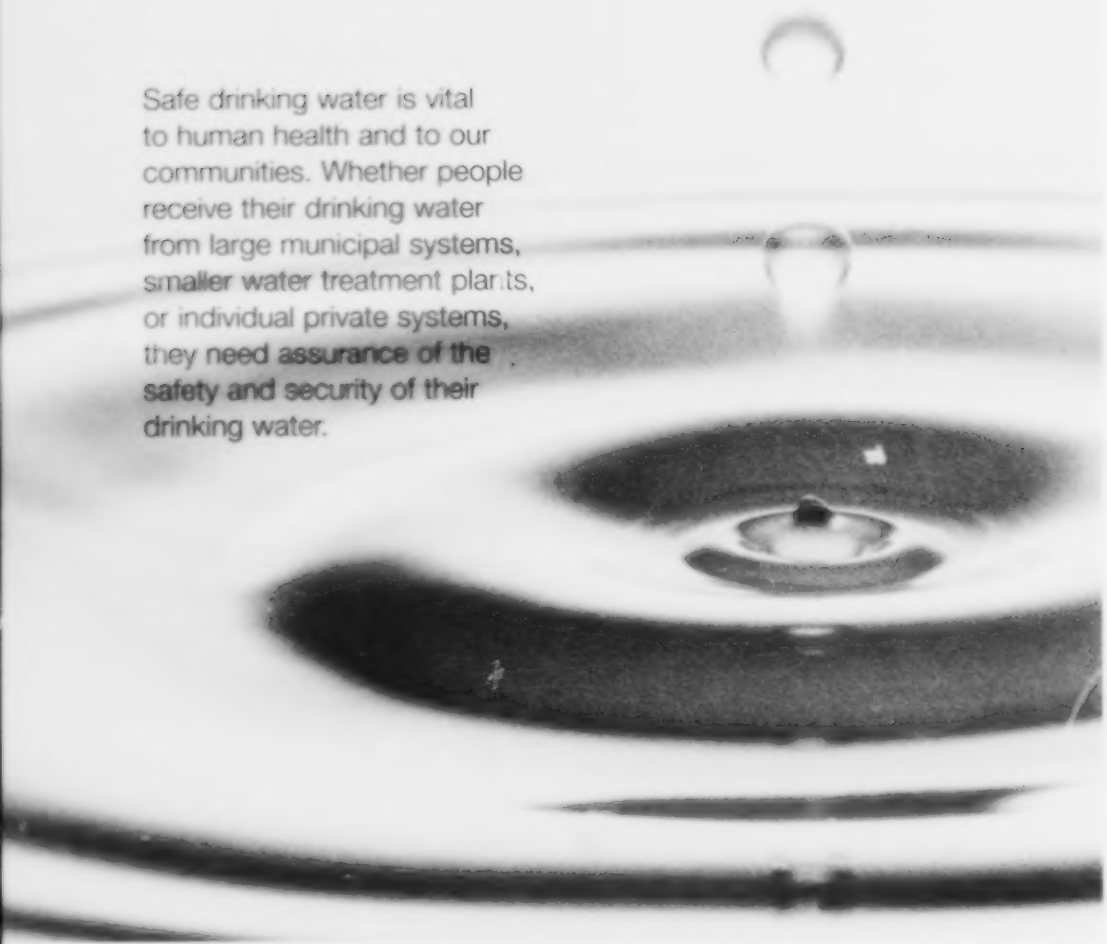
AAFRD = Alberta Agriculture, Food and Rural Development; AENV = Alberta Environment; AIT = Alberta Infrastructure and Transportation; CD = Alberta Community Development; ED = Alberta Economic Development; Energy = Alberta Energy; EUB = Alberta Energy and Utilities Board; HW = Alberta Health and Wellness; ISC = Alberta Innovation and Science; SRD = Alberta Sustainable Resource Development.

This report is a summary of the progress achieved in implementing *Water for Life* programs in 2004-2005. It is organized and presented according to the three outcomes and three key directions identified in *Water for Life*, namely:

- safe, secure drinking water supply (Section 2);
- healthy aquatic ecosystems (Section 3);
- reliable, quality water supplies for a sustainable economy (Section 4);
- knowledge and research (Section 5);
- partnerships for watershed management and stewardship (Section 6); and
- water conservation (Section 7).

For each of the outcomes and key directions, the main program initiatives are discussed along with a brief discussion of priorities, program status, and summaries of projects undertaken in 2004-2005.

Safe drinking water is vital to human health and to our communities. Whether people receive their drinking water from large municipal systems, smaller water treatment plants, or individual private systems, they need assurance of the safety and security of their drinking water.



OUTCOME :
COMMITMENT :

			in 2004/2005	in 2004/2005
short-term (2004/05-2006/07)	- Alberta has a comprehensive strategy to protect Albertans' drinking water.	- Complete an assessment of all drinking water facilities in the province. (See Section 2.1.1.)	✓	
		- Establish an independent, ongoing review process, on a five-year cycle, for Alberta's drinking water program.		
		- Establish emergency protocols, including support by staff and laboratory capacity, to protect Albertans from contaminants in drinking water. (See Section 2.1.2.)	✓	
		- Establish municipal grant criteria to support the development of regional water systems. (See Section 2.1.3.)	✓	
medium-term (2007/08-2009/10)	- Albertans have full and complete knowledge of drinking water issues and real time access to information about the drinking water quality in their community.	- Provide Albertans with access to online reporting of all drinking water facility test sample results.	✓	
		- Improve availability and access of information to all Albertans on private water systems.		
		- Adopt a source-to-tap/multi-barrier approach at all drinking water facilities. (See Section 2.1.2.)	✓	
long-term (2010/11-2013/14)	- Alberta's drinking water infrastructure meets emerging standards and is managed for long-term sustainability.	- Establish a waterborne health surveillance and reporting system.		
		- Upgrade all drinking water facilities to meet new drinking water standards as they are implemented. (See Section 2.1.3.)	✓	
		- Upgrade drinking water in provincial parks and recreation areas to meet new drinking water standards as they are implemented. (See Section 2.1.4.)	✓	
		- Design and implement regional water systems. (See Section 2.1.3.)	✓	

Alberta continues to demonstrate leadership within Canada in providing a very comprehensive drinking water program. Ensuring the health of Albertans through the provision of safe, secure supplies of drinking water and the sustainability of drinking water systems is a key outcome of the Water Strategy.

2.1 Key Program Initiatives

A number of program initiatives are required to assure the sustainability of approved municipal and private drinking water supplies. Key operational actions to be undertaken under *Water for Life* include:

- assessment of drinking water facilities;
- Source-to-Tap/Multi-Barrier Approach;
  - operational support for approved drinking water systems,
  - alternate program – laboratory data quality assurance,
  - enhanced bacteriological testing capacity at the Provincial Laboratory for Public Health,
  - education and technical support for private drinking water systems,
  - public health surveillance system,
- municipal and regional water – sewer systems; and
- provincial park water supplies.

These initiatives are described below, along with key highlights regarding their implementation and progress in 2004-2005.

2.1.1 Assessment of Drinking Water Facilities

Alberta is finalizing the most comprehensive drinking water facility assessment in Canada. The *Drinking Water Facility Assessment Report* and the implementation of its recommendations will be a key component of Alberta's strategy for safe drinking water.

In 2004-2005, Alberta Environment conducted a comprehensive review of the water sources, operations, and treatment performance attributes of over 500 municipal waterworks systems.

The assessment resulted in a detailed *Drinking Water Facility Assessment Report* that provides 10 and 25 year staged scenarios to assure sustainable drinking water supplies for all Alberta communities. Optional proposals and solutions include: remotely monitored and stand-alone facilities; regional pipelines; and innovative regional operation clusters that encourage communities to share the responsibility for provision of safe drinking water. Once this report is finalized, it will be made available to the public.

As a result of this assessment and implementation of the Source-to-Tap/Multi-Barrier Approach (STMBA), Alberta has an opportunity to develop and outline a long-term policy direction for our drinking water program that reduces the risk to public health, addresses the sustainability of our drinking water infrastructure, and increases Albertans' knowledge and confidence in the provision of their drinking water.

Regional lines like the one from Edmonton to Vegreville serve as a model for the future to promote economic sustainability and reduced risk to human health across Alberta. The line to Vegreville was constructed in the 1980s and services many smaller communities along the way that would have otherwise been short of water and economically constrained. The Edmonton and area regional water system provides world-class drinking water services to nearly 50 communities (one million people) within a 100 kilometre radius of the city.

2.1.2 Source-to-Tap/Multi-Barrier Approach

SOURCE-TO-TAP/MULTI-BARRIER APPROACH

The management of the components of a water supply systems in order to reduce risks to public health, including protection of the water in its natural environment, adequate treatment, and distribution to the point of consumption.

Alberta has adopted a Source-to-Tap/Multi-Barrier Approach (STMBA) to ensure the provision of safe, secure drinking water supplies. This approach highlights the importance of protecting rivers, lakes and aquifers which are the sources of our drinking water as well as ensuring effective water treatment and distribution systems.

Components of the STMBA program are described below. Additional information is available on Alberta Environment's drinking water program website, www.gov.ab.ca/env/water/dwq/dwprogram.html.

Operational Support for Approved Drinking Water Systems

Six new Drinking Water Operations Specialists were hired to ensure the integrity of public drinking water supplies – by assisting water treatment operators and owners with continuous improvement of potable water quality. These positions were filled in 2004-2005 and allow Alberta Environment to work closely with waterworks staff and Regional Health Authorities on the full spectrum of the Source-to-Tap/Multi-Barrier Approach. Guidance will also be provided to waterworks staff during emergency situations involving drinking water supplies.

The Drinking Water Operations Specialist positions complement Alberta Environment's existing Regional Services approvals and compliance programs.

Alternate Program – Laboratory Data Quality Assurance

As a result of Alberta Environment's Laboratory Data Quality Assurance Policy, all facilities supplying environmental data required by an approval or a Code of Practice issued by Alberta Environment, must ensure that any sample analysis is completed at a laboratory that is accredited by the Canadian Association of Environmental Analytical Laboratories.

This policy allows an exception (from full accreditation requirements) for small "in-house" labs analyzing samples using test kits for potability. These "in-house" labs must enter the Alternate Laboratory Data Quality Assurance Program. The Alternate Program, scheduled for implementation from 2004-2005 to 2006-2007, consists of site evaluations and proficiency testing, which will determine the facility's ability to analyze samples consistent with acceptable standards and to ensure any discrepancies are detected and corrected in a timely manner.

Alberta Environment is leading this program. The Canadian Association of Environmental Analytical Laboratories is working with contractors to undertake the made-in-Alberta proficiency testing and site visit program. Results and participant feedback to date show the program is providing valuable assistance to operators in their efforts to provide Alberta Environment with accurate testing results in accordance with their approval requirements.

Enhanced Capacity of the Provincial Laboratory for Public Health (Microbiology)

This initiative focuses on enhancing the capacity of Alberta Health and Wellness' provincial laboratory to conduct bacteriological testing of drinking water for both approved municipal and private systems.

The Provincial Laboratory for Public Health (Microbiology) is the centralized testing laboratory for bacteriological analysis of water samples from private and approved municipal drinking water systems in the province. It is also the reference and specialized testing laboratory for detection of waterborne viral, bacterial, and protozoan pathogens and, therefore, plays a vital link in the overall need for effective risk assessments associated with ensuring safe drinking water from microbial contaminants. Another vital function of the lab is providing laboratory diagnostic support to Alberta Health and Wellness and the Regional Health Authorities for investigations of outbreaks related to waterborne enteric disease in the province.

Maximum bacteriological testing capacity has been reached. After the Walkerton tragedy of 2000, testing volumes at the lab increased dramatically, with the lab experiencing annual increases in testing volumes of up to 10 per cent. It was not able to accommodate requests from other departmental initiatives that required support (e.g., surface water assessment programs), nor was it able to support the water stewardship groups in the province to meet their testing needs.

Education and Support for Drinking Water Systems

Similar to Alberta Environment's operation specialists that support approved municipal systems, Alberta Health and Wellness and the Regional Health Authorities require additional staff to provide guidance and support to operators of private drinking water systems.

The key specific objectives of this program initiative are to: (i) maintain and support emergency response protocols to protect Albertans from drinking water risks; and (ii) ensure Alberta Health and Wellness and the Regional Health Authorities have sufficient resources to effectively implement emergency response interventions.

In addition to comprehensive approvals and standards, Alberta also has a communication and action protocol in place for emergencies. This protocol is designed to ensure that Alberta Environment and Regional Health Authorities, public health laboratories, and the owners and operators of municipal water treatment systems can deal effectively with emergency situations, such as failed bacteriological tests.

To continue leadership in this area, Alberta needs to continue to monitor and improve its capacity to respond to and intervene in situations (such as the events that occurred in Walkerton and North Battleford) that may present a risk to public health. It is important to maintain and support emergency response protocols to protect Albertans from risks in drinking water.

Public Health Surveillance System

The public health surveillance system initiative complements the goals and activities of the education and support program initiative, and includes carrying out applied public health research related to water quality and health effects.

In order to continue leadership in the area of public health surveillance, Alberta needs to maintain, improve and diversify its laboratory capacity to monitor water quality for bacteriological and chemical contaminants. A number of existing and emerging issues related to water quality and health need to be addressed through enhancing the applied research capacity in the laboratories. Emerging issues include the potential human health effects of antibiotics and other drugs in drinking water sources, chlorination disinfection by-products, blue-green algal toxins, *Giardia* and other waterborne pathogens, and viruses. This initiative will be led by Alberta Health and Wellness.

Alberta Infrastructure and Transportation was allocated $16 million in capital funding between 2004-2005 and 2006-2007 to oversee grants for municipal and regional waterworks systems.

In 2004-2005, $6.8 million was used along with the existing grant budgets to enhance regional water lines. The following projects were funded:

- Clairmont regional water line;
- Coalhurst potable water supply system upgrade;
- Falher-Smoky River regional water supply system work;
- Lacombe-North Red Deer River water users group programs;
- Plamondon water supply pipeline; and
- Sexsmith regional waterline.

Alberta Community Development received $16 million over three years, beginning in 2004-2005, to upgrade provincial park water systems. The following activities were undertaken in the first year of the program:

- drinking water and sewage systems were assessed, and water drawn from hand pumps was tested in provincial parks and provincial recreation areas across the province;
- over 35 projects were undertaken in provincial parks and recreation areas, including upgrading or replacing water treatment systems, lake intakes, water lines, hand pumps, sewage treatment systems and toilets, as well as the relocation of dump stations;
- major water and sewer systems upgrades were initiated in Kananaskis Country, Dinosaur Provincial Park, Wabamun Lake Provincial Park, and Miquelon Lake Provincial Park; and
- smaller projects undertaken included hand pump replacements in Kananaskis Country, water intake upgrades in Kinbrook Island Provincial Park, and relocation of a trailer dump station in Writing-on-Stone Provincial Park.

The Drinking Water Safety Indicator is a performance measure being used to monitor the effectiveness of Water Strategy initiatives in attaining the goal of safe, secure drinking water supply. This measure evaluates the performance of facilities in delivering safe drinking water and demonstrates continuous improvement of facilities in the way they are operating and reporting analytical results. The indicator is comprised of three sub-measures:

- the Facility Design Standards (FDS) measure is the number of facilities meeting the most recent design standards;
- the Facility Operational Requirements (FOR) measure is the number of incidents where regulatory requirements have not been met that could lead to water quality incidents; and
- the Water Quality (WQ) measure is the number of incidents where health-related limits were exceeded.

The performance measure results for 2003-2004 and 2004-2005 are:

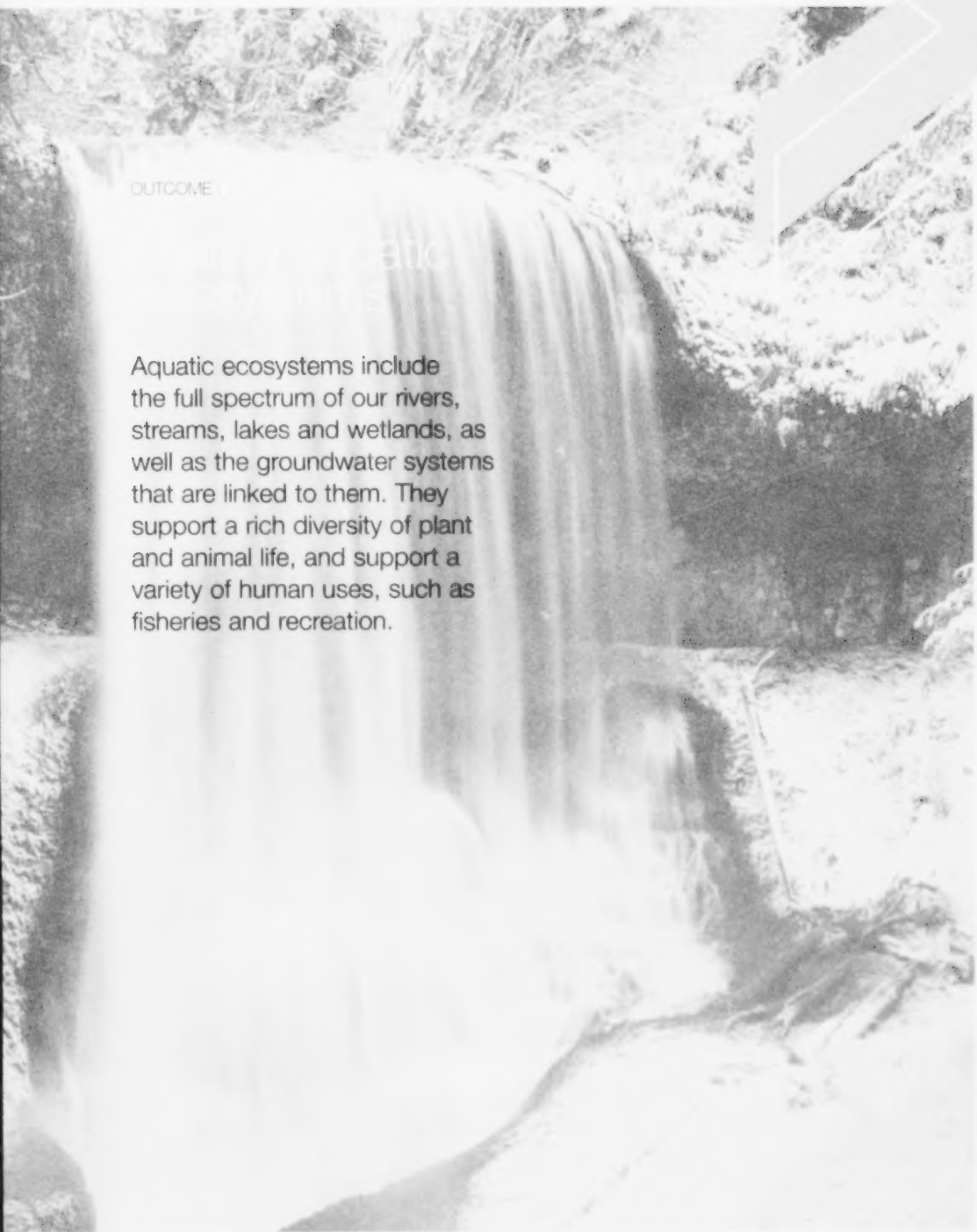
Actual 2003/04	*Actual 2004/05*	*Target 2005/06*	*Target 2006/07*	*Target 2007/08*
FDS: 377 FOR: 59 WQ: 48	FDS: 409 FOR: 45 WQ: 69	To be determined.	To be determined.	To be determined.

In 2004-2005, 75 per cent of regulated water works facilities had treatment technology in place that met the newest facility design standards. This represents a net improvement in water quality technology at 32 facilities over the previous year. Compliance with operational requirements improved from 59 incidents to 45 incidents. Over the same period, the number of water quality incidents increased from 48 incidents at 47 facilities, to 69 incidents at 49 facilities. Of note however, the number of self-reported incidents rose from 15 to 52, while government identified incidents fell from 33 to 17. This indicates operators are becoming more aware of their reporting requirements and their need to report incidents, and are identifying, reporting, and taking action to correct problems immediately.

Additional measures and enhancements to this measure will be developed in partnership with the Alberta Water Council as part of the implementation of specific Water Strategy actions.

Additional Information

Additional information on drinking water programs, ranging from a brochure called *Making Sure It's Safe* which provides answers to general questions about drinking water in Alberta to Health Canada's Drinking Water Quality Guidelines, is available on the Alberta Environment drinking water website at www3.gov.ab.ca/env/water/dwq.



OUTCOME 1

Aquatic ecosystems include the full spectrum of our rivers, streams, lakes and wetlands, as well as the groundwater systems that are linked to them. They support a rich diversity of plant and animal life, and support a variety of human uses, such as fisheries and recreation.

Aquatic ecosystems include the full spectrum of our rivers, streams, lakes and wetlands, as well as the groundwater systems that are linked to them. They support a rich diversity of plant and animal life, and support a variety of human uses, such as fisheries and recreation.

OUTCOME :
COMMITMENT :

			in 2004/2005	in 2004/2005
short term (2004/05-2006/07)	- Efforts to protect aquatic ecosystems in critical areas are underway.	- Establish science-based methods for determining the ecological requirements of healthy aquatic ecosystems. (See Section 3.1.2.)	✓	
		- Develop a system for monitoring and assessing aquatic ecosystems. (See Section 3.1.3.)	✓	
		- Develop a wetland policy and supporting action plan to achieve sustainable wetlands. (See Section 3.1.5.)	✓	
medium term (2007/08-2009/10)	- Water management objectives and priorities for sustaining aquatic ecosystems are established through watershed plans.	- Complete an initial assessment of the status of aquatic ecosystems, including lakes, wetlands, streams and rivers. (See Section 3.1.1.)	✓	
		- Establish, as part of watershed management plans, objectives for aquatic ecosystems. (See Sections 3.1.6 and 3.1.5.)	✓	
long term (2010/11-2013/14)	- Water is managed and allocated to sustain aquatic ecosystems and ensure their contribution to Alberta's natural capital and quality of life are maintained.	- Understand the state of Alberta's aquatic ecosystems. - Maintain and enhance aquatic ecosystems to ensure they meet established objectives.		

Albertans place a high value on being informed and knowledgeable on the status or "health" of aquatic ecosystems.

The goal of the 2004-2005 program was to provide a strong foundation for future actions under the healthy aquatic ecosystem outcome. To accomplish this, it is important that preliminary actions undertaken:

be scientifically defensible and comprehensive;

build on and complement regional and provincial initiatives and needs;

be flexible and strategic; and

raise awareness, build partnerships and capacity for stakeholders.

Water for Life includes the following actions and initiatives to achieve the objective of healthy aquatic ecosystems:

- » initial assessment of aquatic ecosystem health;
- » development of decision support tools for all watersheds;
- » development of methods for monitoring and assessing aquatic ecosystem health;
- » aquatic ecosystem reporting;
- » development of wetland policy and completion of wetland inventories; and
- » development of provincial- and basin-scale ecosystem objectives.

These initiatives are described below, along with key highlights regarding their implementation and progress in 2004-2005.

In order to assess the current state of aquatic ecosystem health, there is a need to review and assess existing stream, river, wetland, riparian and lake data in Alberta. There is also a need to review definitions of "aquatic ecosystem health", the primary scientific literature, and programs in other jurisdictions to determine the most useful methods and techniques to assess aquatic ecosystem health in Alberta. Much of this review was initiated in 2004-2005 by Alberta Environment and Alberta Sustainable Resource Development, with the goal of building a comprehensive and defensible plan to complete the assessment in 2006-2007.

The main actions identified in the plan include: reviewing definitions of aquatic ecosystem health and approaches used in other jurisdictions; reviewing existing stream, river, wetland, riparian and lake data; identifying and assigning priority for unique, significant, environmentally sensitive, or stressed aquatic ecosystems; describing the state of instream flow protection on streams and rivers throughout Alberta; and identifying ecosystem and habitat protection measures required for priority lakes.

RIPARIAN AREA

The area along streams, rivers, lakes and wetlands where water and land interact. These areas support plants and animals, and protect aquatic ecosystems by filtering out sediments and nutrients originating from upland areas.

INSTREAM FLOW NEEDS

The scientifically determined amount of water, flow rate or water level, that is required in a river or other body of water to sustain a healthy aquatic environmental or to met human needs such as recreation, navigation, waste assimilation, or aesthetics. Water quality, riparian health, species and habitat, and channel maintenance are important factors in determining instream flow needs of water bodies.

As outlined in provincial water legislation, the Government of Alberta takes a holistic approach to aquatic management to assure aquatic resources are maintained, restored and enhanced. To measure and assess the health of streams, rivers, and lakes in the province, there is a need to develop reliable and defensible decision support tools that integrate hydrology, water quality, riparian health, channel dynamics, and land use processes.

An important element of this initiative is the long-term development of flow-based tools that are necessary to assess and protect streams, rivers and lakes. Efforts in 2004-2005 focused on the continued development of flow-based assessment tools for use in Alberta, however, long-term investment in a wide variety of tools will be necessary to manage flows, water quality and land activities effectively.

The main elements of this program initative in 2004-2005 included:

- developing science-based tools that determine, maintain and protect the health of rivers, streams and lakes in Alberta (completion of first phase of a fisheries assessment tool and development of hydrology-based Instream Flow Need methods);
- establishing an interdisciplinary working group to oversee the development of decision support tools, research and policy developments; and
- using site-specific Instream Flow Need assessment tools to establish flow recommendations during water management planning.

The flow-based tools can be integrated with a geographic information system to reduce the costs and increase the efficiency of the completed tools for environmental management. A working group, led by Alberta Environment, Alberta Sustainable Resource Development and Fisheries and Oceans Canada, has been formed to oversee the development of these flow-based decision support tools, as well as additional research and policy associated with new and existing tools. The working group is currently documenting the plan and priorities for the long-term development of flow-based decision support tools.

A short-term target identified in *Water for Life* is the development of a system for monitoring and assessing aquatic ecosystems in Alberta. An important step in achieving this target is the development and implementation of a provincial aquatic ecosystem monitoring program to assess long-term trends in health of streams, rivers, wetlands, and lakes. To fully use available monitoring information and scientific knowledge, and to properly expand it into a comprehensive aquatic ecosystem monitoring program, there is a need to take stock of aquatic monitoring programs that exist in the province, as well as to review methods for monitoring and assessing aquatic ecosystem health that are used throughout the world.

Resources were used in 2004-05 by Alberta Sustainable Resource Development and Alberta Environment to complete some preliminary work. Work included an inventory of existing aquatic monitoring and research programs in Alberta, the identification and inspection of existing aquatic sample archives that may be available for analysis, and a review of techniques for monitoring and assessing ecosystem health in Alberta.

6.1.4 Aquatic Ecosystem Reporting

Water for Life consultation identified gaps in our water knowledge, and confirmed there is a growing public demand for information related to aquatic ecosystems and their health. It also confirmed Alberta's aquatic ecosystems must be managed through partnerships within the capacity of individual watersheds, and knowledge is the foundation of effective decision-making. Therefore, an important program element of the healthy aquatic ecosystem outcome is knowledge management and reporting. This includes developing common databases to house information on aquatic ecosystems, reporting the status and trends in the health of stream, river, wetland, riparian and lake ecosystems, and formally assessing the health of aquatic ecosystems in Alberta once every five years using aquatic ecosystem indicators. See Section 6.1.3 for more information on state of the basin reporting being done by Watershed Planning and Advisory Councils.

6.1.5 Wetland Inventory and Policy

Wetlands provide a wide array of essential ecological and socio-economic functions that benefit the people and environment of Alberta, yet there is no current comprehensive wetland inventory that indicates the location, spatial extent, or status of this vital resource. Detailed wetland mapping and database development is fundamental to making sound decisions regarding effective wetland conservation and management, and to ensure sustainable development of Alberta's economy.

The purpose of this program initiative is to address gaps related to knowledge, research, education, and governance. A central part of the program element is completing a wetland inventory, wetland policy, and developing an action plan to support sustainable management of wetlands in Alberta.

Work is in progress to develop a provincial Wetland Policy and a Wetland Management Action Plan. The policy will replace the 1993 *Interim Wetland Policy* and will integrate peatlands to form a unified policy for the province. The Alberta Water Council has struck a Wetland Project Team to recommend a process for how the Alberta Water Council could effectively work with the provincial government in developing wetland policy through to policy endorsement. Progress has also been made on initiatives in the Wetland Action Plan. These include the initiation of a wetland restoration program, a draft wetland restoration/compensation guide, inventory work in the Vermilion River watershed, and completion of a wetland inventory in the City of Calgary.

Additional information and materials on wetlands are available on the internet, including:

- the *Wetland Management in the Settled Areas of Alberta* report, www.gov.ab.ca/env/water/reports/1wmsa.pdf;
- a *Focus on Wetlands* fact sheet, www.gov.ab.ca/env/resedu/edu/focuson/wetlands.pdf; and
- a listing of wetland education and interpretive centres in Alberta, www3.gov.ab.ca/env/resedu/pubs/Wetland_Education_and_Interpretive_Centres_in_Alberta.pdf

Calgary leads the way as one of the first municipalities in Canada to adopt a wetland protection policy. The City Council approved the Wetlands Conservation Plan, which defines priorities and best practices for wetland protection, in May 2004. Calgary estimates they have lost up to 90 per cent of the wetlands in their footprint since presettlement times, and with the tremendous growth of the city, they were moving into areas of significant wetland density.

Calgary Parks are now working to develop an implementation plan for the policy, including developing wetland mitigation and evaluation procedures as well as research and monitoring programs to ensure wetlands remain sustainable and healthy.

Existing wetlands have been mapped; the data will be used to assist city staff in convincing developers to incorporate key wetlands into the design of subdivisions. Ducks Unlimited Canada has partnered with the City to advise on storm water management and wetland conservation.

3.1.6 Provincial- and Basin-scale Ecosystem Objectives

Water management planning and the establishment of water conservation objectives are important short/medium-term targets for major basins in the province. There is also a need to develop partnerships, policy and management strategies to ensure the health of aquatic ecosystems is not compromised at either the provincial-level or at the basin-scale. The actions in this program element will evolve over time. They are centred on completing watershed management plans (though partnerships), to establish flow recommendations and aquatic system objectives in major basins, and to ensure provincial statutes and policy protect and maintain aquatic ecosystems.

Additional information on basin-scale ecosystem objectives is provided in Section 6.1.5 (partnerships).

WATER CONSERVATION OBJECTIVE :

As outlined in Alberta's *Water Act*, a water conservation objective is the amount and quality of water necessary for the protection of a natural water body or its aquatic environment or for the protection of tourism, recreation, transportation, waste assimilation or wildlife needs. It may also include water necessary to maintain a rate of flow or water level requirements.

3.2 Performance Measures

The River Water Quality Index evaluates the water quality of six major Alberta rivers (Bow, North Saskatchewan, Red Deer, Oldman, Athabasca, Smoky/Peace) at key sites, based on monthly data on four groups of variables (metals, bacteria, nutrients, and pesticides), which are combined to provide an indication of overall water quality. The index shows the relative differences in quality between rivers, between sites on the same river (e.g., stations upstream and downstream from developed areas), and over time.

The performance measure results for 2003-2004 and 2004-2005 and the targets for 2005 through 2008 are:

actual 2003/04	actual 2004/05	target 2005/06	target 2006/07	target 2007/08
5 out of 6 river systems have "good" to "excellent" water quality.	5 out of 6 river systems have "good" to "excellent" water quality.	6 out of 6 river systems have "good" to "excellent" water quality.	6 out of 6 river systems have "good" to "excellent" water quality.	6 out of 6 river systems have "good" to "excellent" water quality.

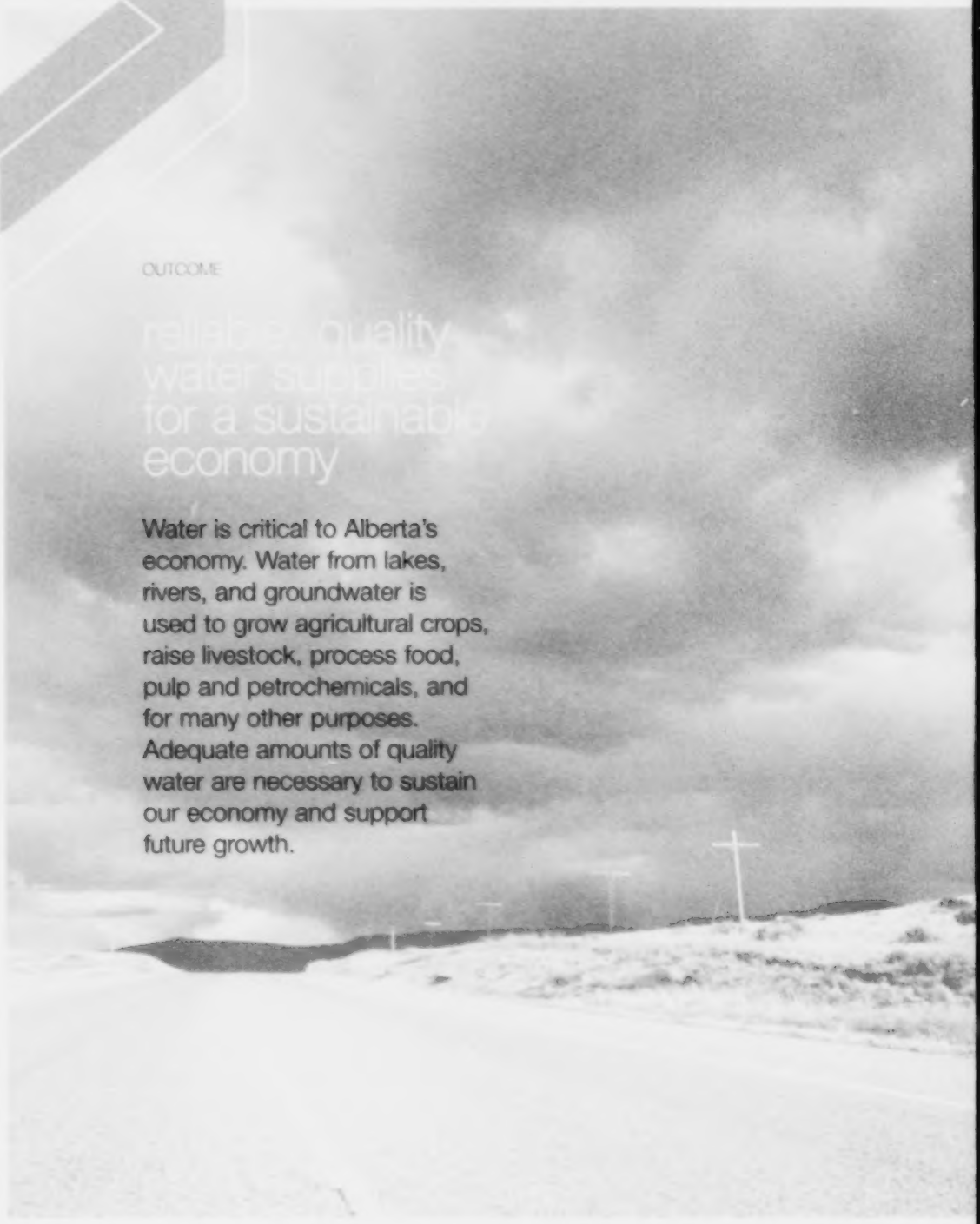
Additional measures and enhancements to this measure will be developed in partnership with the Alberta Water Council as part of the implementation of specific Water Strategy actions.

More information on the River Water Quality Index is available on the Internet at www.gov.ab.ca/env/water/SWQ/resources01.cfm

3.3 Additional Information

Additional information on healthy aquatic ecosystem programs is available on:

- the Alberta Environment surface water quality website www.gov.ab.ca/env/water/SWQ/index.cfm;
- the *Focus on Fisheries Management* fact sheet, www.gov.ab.ca/env/resedu/edu/focuson/fishmgmt.pdf;
- the Regional Aquatics Monitoring Program website focusing on aquatic health monitoring in the oilsands area, www.ramp-alberta.org/what.php; and
- the Alberta Biodiversity Monitoring Program website, www.abmp.arc.ab.ca.



OUTCOME

reliable, quality water supplies for a sustainable economy

Water is critical to Alberta's economy. Water from lakes, rivers, and groundwater is used to grow agricultural crops, raise livestock, process food, pulp and petrochemicals, and for many other purposes. Adequate amounts of quality water are necessary to sustain our economy and support future growth.

reliable, quality water supplies for a sustainable economy

OUTCOME : RELIABLE, QUALITY WATER SUPPLIES FOR A SUSTAINABLE ECONOMY
COMMITMENT : ALBERTANS WILL BE ASSURED THEIR WATER IS MANAGED EFFECTIVELY TO SUPPORT ECONOMIC DEVELOPMENT

	targets	actions	work initiated in 2004/2005	work completed in 2004/2005
short-term (2004/05-2006/07)	• A broad range of water management tools and techniques are implemented.	• Determine the full cost of providing water through Alberta's water management infrastructure.		
		• Authorize water allocation transfers within all watersheds. (See Section 4.1.2.)	✓	
		• Develop and implement transboundary agreements in cooperation with neighbouring jurisdictions. (See Section 4.1.3.)	✓	
		• Continue to manage water resources on the "first-in-time, first in right" principle, and in accordance with the Water Act. (See Section 4.1.4.)	✓	
		• Evaluate, as part of the watershed planning process, water management infrastructure needs. (See Section 4.1.5.)	✓	
medium-term (2007/08-2009/10)	• Water management objectives and priorities to support sustainable economic development are established through watershed plans.	• Monitor, evaluate and report on the water allocation transfer system. (See Section 4.1.2.)	✓	
		• Administer and operate Alberta's water management system to meet transboundary agreements. (See Section 4.1.3.)	✓	
long-term (2010/11-2013/14)	• Water is managed and allocated to support sustainable economic development and the strategic priorities of the province.	• Review the water allocation transfer system to ensure a viable market that moves water to support sustainable economic development.		
		• Manage Alberta's provincial and district-owned water infrastructure for long-term sustainability. (See Section 4.1.6.)	✓	

Water is critical to Alberta's economy. Water from lakes, rivers, and groundwater is used to grow agricultural crops, raise livestock, process food, pulp and petrochemicals, and for many other purposes. Adequate amounts of quality water are necessary to sustain our economy and support future growth.

OUTCOME :
COMMITMENT :

		in 2004/2005	in 2004/2006
short term (2004/05-2006/07)	A broad range of water management tools and techniques are implemented.	- Determine the full cost of providing water through Alberta water management infrastructure.	
		- Administer water allocation transfers within a watershed. (See Section 4.1.1.)	✓
		- Develop and implement transboundary agreements in cooperation with neighbouring jurisdictions. (See Section 4.1.2.)	✓
		- Continue to manage water resources on the "first in time, first in right" principle, and in accordance with the Water Act. (See Section 4.1.3.)	✓
		- Evaluate, as part of the watershed planning process, water management infrastructure needs. (See Section 4.1.5.)	✓
medium term (2007/08-2009/10)	- Water management objectives and priorities to support sustainable economic development are established through watershed plans.	- Monitor, evaluate and report on the water allocation transfer system. (See Section 4.1.2.)	✓
		- Administer and operate Alberta's water management system to meet transboundary agreements. (See Section 4.1.3.)	✓
long term (2010/11-2013/14)	- Water is managed and allocated to support sustainable economic development and the strategic priorities of the province.	- Review the water allocation transfer system to ensure a viable market that moves water to support sustainable economic development.	
		- Manage Alberta's provincial and district-owned water infrastructure for long-term sustainability. (See Section 4.1.6.)	✓

4 reliable, quality water supplies for a sustainable economy

Water is essential for economic development. Communities need water for municipal, recreational, hydropower, industrial, and agricultural development. To ensure continuation of a high quality of life for all Albertans, a sustainable and reliable supply of water must be assured.

Over the years, Alberta has managed water by the use of regulatory and management tools, and by meeting obligations to transboundary water agreements. The recent implementation of *Water for Life* has challenged Albertans to examine factors that relate to the strategy outcomes and performance measures. For example, to determine the viability of supplying water for specific sectors of the economy, it has become essential to assess the full cost of the water supply, including any potential water storage infrastructure that may be required. It is also essential to survey potential strategic water storage sites that may leverage how water is delivered and the time and quantity needed.

The success of Alberta in using its water resources to the greatest advantage depends on Albertans becoming knowledgeable about water availability, the cost of supplying water, and the use of good water management tools for the allocation of water to various sectors of the economy.

This year, the reliable quality water supply program focused on:

- the acquisition of information on all man-made water conveyance systems, operated by government and private organizations, for determining the full cost of providing water through Alberta's water management infrastructure;
- the evaluation of potential water storage sites and diversion scenarios, by compiling an inventory of all historical sites that have been investigated;
- the development and implementation of a tracking system for water allocation transfers;
- the maintenance and operation of the water management infrastructure to meet transboundary water agreements with other jurisdictions; and
- continuing to allocate water following the "first in time, first in right" principle.

FIRST IN TIME, FIRST IN RIGHT :

The principle used to prioritize water rights in Alberta. The principle, established in 1894, means water rights are prioritized according to the seniority of the licence, regardless of its use. The older the licence, the higher the user is on the priority list.

4.1 Key Program Initiatives

Water for Life includes the following actions and initiatives to achieve the objective of reliable, quality water supplies:

- » understand the full cost of providing water;
- » track and evaluate water allocation transfers;
- » meet trans-boundary agreements;
- » manage water resources in accordance with the *Water Act;*
- » assess current and future water management infrastructure needs; and
- » maintain water management infrastructure.

These initiatives are described below, along with key highlights regarding their implementation and progress.

4.1.1 Full Cost of Providing Water

The program involves:

- determining the full cost of water provided by Alberta's existing water management infrastructure; and
- requiring waterworks system owners to prepare financial plans to account for the full cost of providing safe drinking water.

Understanding the full cost of operating and maintaining such systems allows Albertans to better understand the relationship between the cost and value of water. Further, full cost accounting for the delivery of water infrastructure and safe drinking water is needed to ensure adequate long-term resources are available to deliver storage needs and safe drinking water, support new development, sustain the systems by accounting for all costs (including depreciation), facilitate the operation and maintenance of infrastructure, and plan for future requirements.

Clarity of methodology is required prior to determining the full cost of water. As an initial step, a consultant will be retained in 2005-2006 to develop the scope and parameters for this task. The second step will be to proceed with a study to determine and report on the full cost of water.

4.1.2 Water Allocation Transfers

Water allocation transfers occur after the holder of an exiting water withdrawal licence agrees to provide all or part of the amount they are allocated to another person or organization and Alberta Environment approves the transfer. Water allocation transfers can occur only if authorized under an approved water management plan or by the Lieutenant Governor in Council.

Currently, water allocation transfers are only authorized in the South Saskatchewan River Basin (which includes the sub-basins of the Red Deer, Bow and Oldman Rivers) where water supply is over or approaching allocation limits. More information is needed in order to evaluate which other basins could benefit from the practice and what can be done to improve outcomes within basins where the practice is authorized.

The components of this program initiative include designing and implementing a water allocation tracking system to allow monitoring and reporting, and reviewing the water allocation transfer system to ensure a viable market that moves water to support sustainable economic development (while ensuring the aquatic environment is protected).

Alberta Environment's Environmental Management System was adapted to include the ability to generate reports on transfers in the authorized basins. A reporting system that advises on the state of water transfers and their benefits is being designed.

A copy of the *Water Act, Administrative Guideline for Transferring Water Allocations* is available at www.gov.ab.ca/env/water/legislation/Guidelines/Transfer_Guidelines.pdf.

Phase one of the South Saskatchewan River Basin water management plan, approved in June 2002, is well into implementation. The plan brought into use new tools provided by the Water Act for the improvement of water management.

Use of water allocation transfers. This allows water allocations to be separated from the land to which they are originally attached, and moved to a different point of diversion for a different purpose. Transfers require the approval of Alberta Environment. They provide an incentive for water conservation, as the licence holder can improve water use efficiency and make water available to another user, with the same priority as the original licence. The best example of the intended benefits of transfers is they can make reliable water supplies available to new industries in watersheds in which a new licence would have a significant risk of not receiving water in drier years. Five transfers have been approved by Alberta Environment to date and about 20 applications are under review.

Use of water conservation holdbacks. This tool allows Alberta Environment to withhold up to 10 per cent of a transferred allocation. The withheld water is now being returned to the river for the benefit of the aquatic environment.

4.1.3 Transboundary Agreements

Alberta shares watersheds with its neighbouring provinces, territories, and country. To cooperatively manage these shared waters and to minimize the risk of transboundary disputes, Alberta has entered into formal agreements with its neighbours. These agreements must be maintained and new elements implemented.

Alberta Environment continues work with the:

- International Joint Commission examining and reporting on the *1909 Boundary Waters Treaty* for the Milk and St. Mary Rivers;
- Prairie Provinces Water Board administering the *1969 Master Agreement on Apportionment;* and
- Mackenzie River Basin Board to implement the *1997 Mackenzie River Basin Transboundary Waters Master Agreement* to maintain the ecological integrity of the Mackenzie River watershed.

In order for Alberta to meet its commitments under all these agreements, it must monitor the use of water on a real-time basis, manage those who use water, and manage the provincial water infrastructure. Also, long-term planning must take these commitments into account when determining the potential future available supply of water.

Additional information on apportionment agreements is available online at www.gov.ab.ca/env/water/gwsw/quantity/waterinalberta/index.cfm. Specific information to each agreement can also be found at:

» International Joint Commission, www.ijc.org;

» Prairie Provinces Water Board, www.pnr-rpn.ec.gc.ca/water/fa01/index.en.html; and

» Mackenzie River Basin Board, www.mrbb.ca.

In 2004, Alberta met all of its apportionment obligations to its neighbours, as defined by the 1969 Master Agreement on Apportionment *and the* 1909 Boundary Waters Treaty.

Interprovincial Agreements – *The sharing of waters of eastward-flowing streams between Alberta and Saskatchewan is governed by the* 1969 Master Agreement on Apportionment. *The agreement states that "Alberta shall permit a quantity of water equal to one-half the natural flow of each watercourse to flow into the Province of Saskatchewan," with some specific exceptions and with requirements to meet minimum flow needs. (For example, as the flow of the Cold River originates in both Alberta and Saskatchewan, Alberta is required to pass more than half of the natural flow, in this case 68.4 per cent, to Saskatchewan.) Alberta must account for this 50 per cent annually. That is, Alberta can use all but the minimum flow during parts of the year as long as, at the end of the year, 50 per cent goes to Saskatchewan. In 2004, Alberta met and exceeded its Saskatchewan apportionment obligations.*

2004 Apportionment Balance for Alberta-Saskatchewan

	(dam³)	(%)	(%)
Cold River	660 247	68.4	68.7
South Saskatchewan River	7 326 000	50.0	52.8
Battle Creek	7 008	75.0	84.1
Middle Creek	809	75.0	77.5
Lodge Creek	5 083	75.0	90.7

dam³ = cubic decametre

International Agreements – The 1909 Boundary Waters Treaty *governs the sharing of waters of international streams crossing the Canada-United States border. The sharing of waters of the St. Mary and Milk Rivers in southern Alberta are governed by the treaty, which is administered by the International Joint Commission. The natural flow on these rivers is apportioned on a daily basis. During the irrigation season from April 1 to October 31, Canada receives 75 per cent of the natural flow of the St. Mary River, while the United States receives 75 per cent of the flow of the Milk River. Additional conditions are in place for conditions where*

the natural flow of each river exceeds 666 cubic feet per second. Outside the irrigation season, Canada and the United States each receive an equal share (50 per cent) of the natural flow of both rivers. In 2004, Alberta met and exceeded its international apportionment obligations, and Alberta received its apportionment entitlements from the United States.

2004 Apportionment Balance for Canada-United States

[illegible]	[illegible] (dam^3)	[illegible] (%)	[illegible] (%)
Milk River	68,212	66.7	82.5
St. Mary River	701,389	61.4	67.4

*For the Milk River, the country share is that apportioned to the United States and the flow is that passed by Canada to the United States. For the St. Mary River, the country share is that apportioned to Canada and the flow is that passed by the United States to Canada.

The *Water Act* came into effect on January 1, 1999. It supports and promotes the conservation and management of water in Alberta. Specifically, the Water Act requires an approval and/or licence be obtained before undertaking a construction activity in a water body or before diverting and using surface and groundwater. An approval will include conditions under which an activity must take place. The licence identifies the source of the water supply, the location of the diversion site, an allocation of water to be diverted and used from that source, the priority of the "water right" established by the licence, and the conditions under which the diversion and use must take place.

Water allocation is an ongoing activity carried out by Alberta Environment through the water licensing process. A coordinated and consistent approach is being developed for the review and revision of legislation which will be carried out in collaboration with partners and stakeholders.

Additional information on the *Water Act* and water management tools is available on Alberta Environment's water website at www.gov.ab.ca/env/water/legislation/index.cfm.

4.1.5 Water Management Infrastructure Assessment

The demand for water is not always where the supply exists. The goal of this program is to compile information and determine the feasibility of potentially suitable on-stream and off-stream sites for future consideration in meeting the water supply needs of Albertans. The program involves initial evaluation of potential water storage sites as part of the watershed planning process. Prior to evaluating potential water storage sites and diversion scenarios, an inventory of all historical sites that have been investigated must be prepared. A consultant was retained in 2004-2005 to compile a list of provincial water storage sites and diversion scenarios previously examined.

3.1.6 Water Management Infrastructure Maintenance

This program is focused on ensuring Alberta will have effective and efficient water management infrastructure now and in the future. It includes enhancing the operation and maintenance program, reducing the long-term rehabilitation costs, and providing maximum benefits from Alberta's water management infrastructure.

The operation and maintenance responsibilities are ongoing. A program highlight from 2004-2005 is the continued development of partnership opportunities for the operation and maintenance of the province's infrastructure, including implementation of the work plan for the Western Headworks Shepard Stormwater Diversion Project.

4.2 Performance Measures

A performance measure that is being used to monitor the effectiveness of Water Strategy initiatives in attaining the goal of reliable, quality supplies for a sustainable economy is Effective Water Management Infrastructure. This includes headworks, dams and irrigation canals. It measures the physical condition (PC), utilization (U), and functional adequacy (FA) of provincially-owned water management infrastructure. Baselines are now being established or updated.

The performance measure results for 1999 and 2004-2005 and the targets for 2005 through 2008 are:

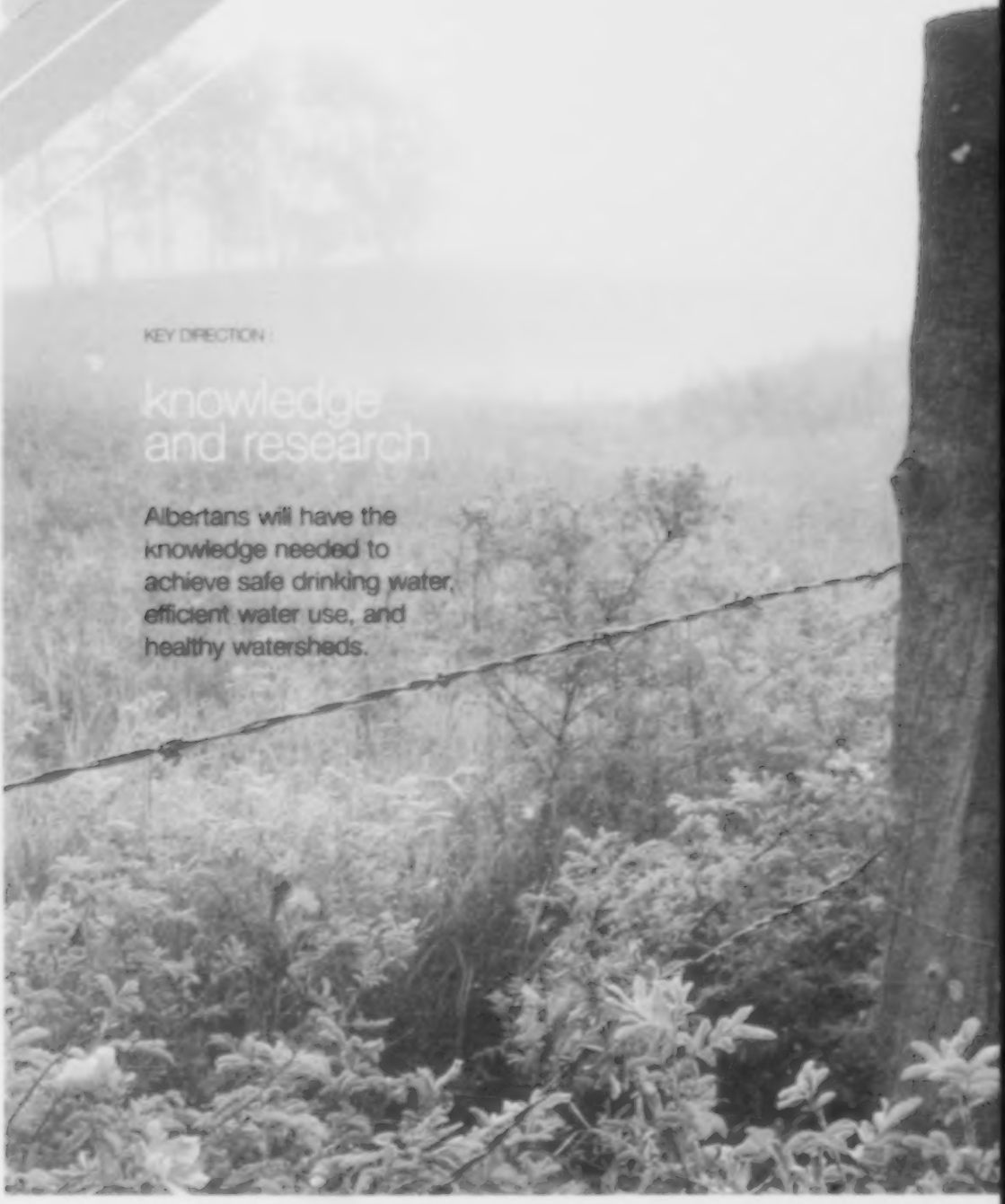
1999	2004/05	2005/06	2006/07	2007/08
PC: 90%	PC: 89.5%	PC: Maintain Baseline	PC: Maintain 2005-2006 Value	PC: Maintain 2005-2006 Value
U: Establish Baseline	U: Establish Baseline	U: Establish Baseline	U: Maintain 2005-2006 Value	U: Maintain 2005-2006 Value
FA: 99%	FA: 99%	FA: Maintain Baseline	FA: Maintain 2005-2006 Value	FA: Maintain 2005-2006 Value

Note that PC percentage includes headworks, dams and irrigation canals in fair, good or excellent condition.

Additional measures and enhancements to this measure will be developed in partnership with the Alberta Water Council, as part of the implementation of specific Water Strategy actions.

4.3 Additional Information

Additional information and guidelines on water management are available on Alberta Environment's website at www.gov.ab.ca/env/water/Legislation/Guidelines/index.cfm.



KEY DIRECTION

knowledge and research

Albertans will have the knowledge needed to achieve safe drinking water, efficient water use, and healthy watersheds.

KEY DIRECTION :
COMMITMENT :

		Progress in 2004/2005	Issues / Gaps in 2004/2005
short term (2004/05-2006/07)	- Comprehensive water research and education programs are established.	Establish a provincial, multi-disciplinary water research centre. (See Section 5.1.2.)	✓
		- Develop a provincial water research plan. (See Section 5.1.1.)	
		Establish a public awareness and education program to ensure Albertans have easy access to water resource information and services. (See Section 5.1.10.)	✓
		- Complete an assessment of Alberta's surface water quality. (See Section 5.1.4.)	✓
medium term (2007/08-2009/10)	- Mechanisms are in place to transfer water-related knowledge to Albertans.	- Establish a provincial water information centre that brings together information from both private and public sources. (See Section 5.1.3.)	✓
		- Report research results to Albertans.	
		- Update water quality programs to support watershed protection and planning. (See Section 5.1.4.)	✓
long term (2010/11-2013/14)	- Albertans have the knowledge, costs and motivation to implement actions that will maintain or improve the province's water resources.	- Complete flood risk maps and warning systems for all communities where a flood risk exists. (See Section 5.1.8.)	✓
		- Understand the state of the quality and quantity of all surface water supply in all major basins. (See Section 5.1.5.)	✓
		- Understand the state of the quality and quantity of Alberta's groundwater supply. (See Section 5.1.6.)	✓

Albertans will have the knowledge needed to achieve safe drinking water, efficient water use, and healthy watersheds.

KEY DIRECTION :
COMMITMENT :

		✓
		✓
		✓
		✓
		✓
		✓
		✓
		✓

5 Knowledge and research

One of the basic principles of the *Water for Life* strategy is that all Albertans share responsibility for the wise use and sustainability of our water resources. Knowledge about the quantity, quality, and trends in Alberta's water supply is vital to the effective management of the resource, and to enable Albertans to become informed participants in water management decisions that affect their watersheds.

The primary goal of the Knowledge and Research component of *Water for Life* is to implement three key pieces to an effective knowledge base:

conducting inventory work to fill in our information gaps;

conducting research to ensure we have the knowledge to address new and emerging issues; and

ensuring all water related knowledge and information is readily accessible to all parties, including the public, who are participating in decisions regarding the use and management of Alberta's water.

In 2004-2005, focus was primarily on assessing the adequacy of data and information, and the development of tools that will eventually provide Albertans with web-based, self-serve access to data and information on Alberta's water resources. In the coming years, efforts will focus increasingly on collecting additional data to fill identified gaps, providing access to data and information, and conducting research to ensure we have the knowledge to address new and emerging water issues. Public accessibility to all available data and information is fundamental to ensuring Albertans become active participants in water management decisions.

5.1 Key Program Initiatives

Water for Life identifies information and knowledge of our provincial water resources as the most critical element in our ability to manage water effectively. Key actions to be undertaken include the development of:

- a provincial water research plan;
- a provincial, multi-disciplinary water research centre;
- the Alberta Water Information Centre;
- surface water quality assessment and planning;
- state of the quality and quantity of surface water supplies;
- state of the quality and quantity of groundwater supplies;
- policies and tools to enhance water management;
- flood risk maps and warning systems;
- drought monitoring and information; and
- education and outreach programs.

These initiatives are described below, along with key highlights regarding their implementation and progress.

5.1.1 Provincial Water Research Plan

Water for Life covers many topic areas, from water quality and quantity management, aquatic ecosystem protection, and the development of market mechanisms for water conservation. For these and many more topic areas, Albertans require a greater understanding so improved water management decisions can be made. The purpose of a provincial water research plan is to identify research priorities, focus provincial resources on these priorities, create the capacity to address priorities, coordinate research efforts among researchers, track the research that is being undertaken, and ensure research findings are available to water management decision-makers.

Alberta Innovation and Science and the Alberta Science and Research Authority are leading the development of a provincial water research plan. A Steering Committee, which includes members from the Alberta Water Council, is established, and a contract to develop a water research strategy is underway. The water research strategy will include a business case for water research, the identification of research priorities, and an implementation plan for water research.

5.1.2 Provincial, Multi-disciplinary Water Research Centre

One element of the provincial water research plan will be the establishment of a new research centre that will work with the Alberta Water Council and the Alberta Science and Research Authority to implement the research plan. The roles of the research centre will be more clearly defined as the research plan is developed, but include providing information to establish research priorities, directing funding toward priorities, coordinating research, and making research results available to water managers and stakeholders.

ALBERTA SCIENCE AND RESEARCH AUTHORITY (ASRA)

Established in 1994, ASRA is an independent board comprised of members from Alberta's academic, business and research communities. ASRA works with its partners to perform two core activities. It advises government on priorities and policies for science and research, and it facilitates strategic initiatives on how best to promote science and research across its three strategic priorities: life sciences; energy; and information and communication technology.

Alberta Ingenuity Centre for Water Research

The Alberta Ingenuity Centre for Water Research was established as a tri-university partnership between the Universities of Lethbridge, Calgary and Alberta. At inception, the centre received $7.5 million over five years to conduct water research.

The centre brings together scientists, engineers and social scientists from across the province to investigate pressing water-related research questions and fill knowledge gaps pertinent to Alberta. The Alberta Ingenuity Centre for Water Research is focused on research on the interrelation of water quality and quantity in four areas:

- *watersheds;*
- *water ecology;*
- *safety of water and wastewater; and*
- *economics, policy and risk.*

In all four areas, researchers will consider water systems in the different eco-regions of Alberta. The natural diversity, combined with the broad range of human activity and alteration, provides an opportunity to extend our understanding of the processes underlying the quantity and quality of Alberta's water.

For more information on the Alberta Ingenuity Centre for Water Research and the research themes, visit their website at http://www.aicwr.ca.

5.1.3 Alberta Water Information Centre

The Alberta Water Information Centre is being developed to provide Albertans with self-serve access to information from both public and private sources about the state of Alberta's water resources, including quantity, quality, licensed commitments, and actual use of surface water and groundwater. Developing the Alberta Water Information Centre will reduce the effort required by Albertans to gain access to this information.

Developing the Alberta Water Information Centre is a multi-year project initiated in 2003-2004. The first phase of the project focused on building a data warehouse infrastructure and on building processes to extract surface water quality data from Alberta Environment's operational system. Work began to develop a series of standard surface water quality information products (tables, graphs, etc.) to meet the common requests received from the public for water quality data. The first roll out of the Alberta Water Information Centre was made available to the public in February 2005.

The next areas of focus will be incorporating information on water licences and licensed use, developing additional data and information products on surface water quantity and quality, developing ad hoc reporting capabilities, and beginning to incorporate other sources of data into the Alberta Water Information Centre.

In addition to the Alberta Water Information Centre, Alberta Environment launched a State of the Environment website in June 2005. The site includes reports and information on the current status and trends in Alberta's water quality and water supply. It can be accessed at www3.gov.ab.ca/env/soe/water.html.

The first release of the Alberta Water Information Centre was made available to the public in February 2005. This release provides self-serve access to reports on surface water quality.

The Alberta Water Information Centre Link is www.gov.ab.ca/env/water/water_information_centre.cfm.

5.1.4 Surface Water Quality Assessment and Planning

The existing surface water assessment programs consist of monitoring, evaluation, and reporting by provincial and federal departments (Alberta Environment, Alberta Sustainable Resource Development, Alberta Agriculture, Food and Rural Development, Environment Canada, etc.), industry-funded groups (Regional Aquatic Monitoring Program, etc.), and watershed protection groups (Watershed Planning and Advisory Councils and Watershed Stewardship Groups). The latter are largely supported by the Government of Alberta through partnerships. These programs involve a variety of monitoring networks and investigative surveys, with varying monitoring frequencies and parameters. Although specific program objectives vary, in general they are all aimed at documenting and understanding the water quality and ecosystem health of lakes and rivers in the province.

Information on surface water quality in Alberta can be obtained online at: www.gov.ab.ca/env/water/SWQ/index.cfm. Specific information on the Northern Rivers Ecosystem Initiative studies can be obtained at www.gov.ab.ca/env/water/nrei/northern_rivers-alberta.html.

5.1.5 State of Quality and Quantity of Surface Water Supplies

This multi-year program is intended to achieve the following two outcomes:

- understanding the state of surface water resources, and
- providing Albertans with accessible information on surface water supply so informed decisions on its use and management can be made.

In 2004-2005, *Water for Life* funds were used to review the surface water monitoring networks and programs, including compiling a list of all data collectors and data collection sites as well as conducting a review and rationalization of Alberta's data collection network. The focus of the review was to assess the effectiveness of existing monitoring programs and provide recommendations for enhancements.

Providing Albertans with reliable access to surface water data information is necessary to allow partners to actively participate in and make informed decisions on water management. As indicated in Section 5.1.3, in 2005 Alberta Environment launched the web-based Alberta Water Information Centre and the first online State of the Environment Reports which include information on surface water supplies.

5.1.6 State of Quality and Quantity of Groundwater Supplies

The principal outcomes of the *Water for Life* groundwater program are to enhance Albertans' knowledge of the quantity and quality of useable groundwater resources, develop and use predictive tools to manage the resource in a sustainable manner, and report on the status of the resource.

As the collection and interpretation of groundwater data are costly and resource-intense activities, the knowledge enhancement component will be conducted on a watershed scale, with one or two watersheds evaluated every two years. Ideally, these projects could be linked with the development of water management plans in each watershed.

Similar to the surface water monitoring program review, in 2004-2005, Alberta Environment retained a consultant to evaluate the existing provincial groundwater monitoring networks and databases, and provide recommendations for expansion and improvement of the system. The consultant's recommendations are now being reviewed.

In 2004-2005, a detailed numerical model was built for the Cold Lake–Beaver River groundwater system as part of an upgrade to the watershed management plan. The next major project proposed is the delineation of the depth of useable groundwater (i.e., water with total dissolved solids concentration < 4,000 mg/L) throughout Alberta. Delineation will support oilfield exploration activities by identifying groundwater resources that must be protected during exploration and recovery activities.

SALINE GROUNDWATER

According to Alberta's *Water (Ministerial) Regulation*, saline groundwater is that with a total dissolved solids concentration exceeding 4,000 milligrams per litre.

The principal outcomes of this *Water for Life* program are tied to the promotion of continuous improvement for wastewater effluent discharge, development of a generic groundwater numerical model that will enable continuous evaluation of groundwater systems, and development of policies and other tools to support management and protection of groundwater resources.

Groundwater modeling has been completed for the Cold Lake-Beaver River watershed. The challenge for the future is to develop a generic approach that could link these models.

Alberta Environment is currently leading the development of a model for a comprehensive provincial surface water management system. The developmental process will require significant stakeholder consultation. In time, this process will undertake a gap analysis to assess policies and other tools to support management and protection of groundwater resources.

More than $210 million has been paid to private citizens, small businesses and local governments for flood damages since 1974. The principal objectives of the Flood Damage Reduction Program are to increase public safety and reduce damage due to floods in Alberta. The program initiative includes identifying priority rural flood risk areas, preparing flood risk maps, and expanding Alberta's flood forecasting network to provide consistent flood warnings.

In 2004-2005, Alberta Environment continued to collect data to support the flood risk mapping program. Data were collected for the development of flood risk mapping for Crowsnest Pass, Eckville and Carbon. Additional data were collected for Lethbridge to evaluate potential changes to the flood risk mapping since the last large flood in 1995. As part of expanding the flood-forecasting network, a list of new hydrometric stations to be built has been submitted for funding consideration. Flood risk maps for 35 communities are accessible on Alberta Environment's website at: www.gov.ab.ca/env/water/flood/index.html.

role of alberta environment in flow forecasting

The primary responsibility of Alberta Environment's River Forecasting staff is to alert Albertans to high stream flows and floods. During the summer of 2005, the River Forecasting team managed 17 events, the most severe of which were three events in June which caused flooding in Pincher Creek, High River, Okotoks, Medicine Hat, Calgary, Red Deer, Drumheller and Edmonton. In all cases, River Forecasting provided advance warning of floods, allowing communities and other government agencies to mitigate the effects of flooding.

As an example, on June 19, 2005, inflows to Gleniffer Lake behind the Dickson Dam peaked at 2,187 cubic metres per second, more than enough to cause severe flooding at downstream communities, including Red Deer and Drumheller. Though the dam was able to reduce the peak outflow, the Little Red Deer River, which joins the Red Deer downstream of the dam, was producing flows five times larger than had ever been measured. Had the two peaks coincided, the resulting flows would have exceeded the dikes at Drumheller. The operators of the Dickson Dam were in close contact with River Forecasting and able to reduce the discharges from the dam to compensate for the high flows, preventing flooding in Drumheller.

The Alberta Drought Risk Management Plan was established to provide an immediate, effective response during a drought crisis. It also strives to reduce the impacts of future drought through planning and preparedness. Implementation of the plan will help farmers, ranchers, municipalities, and other provincial agencies be more prepared and less vulnerable to drought, ensure proactive, coordinated and effective actions before, during, and after a drought crisis, and ensure a consistent and fair response to drought by government.

In 2004-2005, the meteorological network in Alberta was enhanced, a web-based viewer of drought related information was initiated and soil moisture maps were prepared and distributed. The drought maps and reports maps are available on the Alberta Agriculture, Food and Rural Development website at www.agric.gov.ab.ca.

Each year, there will be soil moisture and water supply shortages somewhere in Alberta. Near real-time drought reporting ensures proper planning and preparedness response. Continued drought extension and education initiatives are required. Meteorological monitoring is the foundation for determining the extent and response to drought impacts.

Drought monitoring is led by Alberta Agriculture, Food and Rural Development, with support from Alberta Environment, Environment Canada and the Prairie Farm Rehabilitation Administration.

Education and outreach activities focus on creating awareness and understanding of water topics and issues, as well as providing opportunities and motivation for Albertans to participate in stewardship activities. A provincial Water Education Framework was initiated to help align water education efforts with Water Strategy goals and to support organizations working towards similar outcomes.

Alberta Environment partnered with Cows and Fish: Alberta Riparian Habitat Management Society to increase awareness, understanding and stewardship activities related to land-use activities that affect water bodies.

To build understanding of water resources and water management, Alberta Environment partnered with Inside Education and other organizations to host a professional development program for Alberta educators from July 7 to July 12, 2004. Educators heard from representatives of government, industry and environmental groups. Given the success of the 2004 program, Inside Education is leading another Water Education Institute in summer 2005.

Alberta Environment also partnered in the planning and delivery of the first Alberta Water Quality Awareness Day program. This pilot program was designed for a wide range of Albertans, including schools, businesses, municipalities, watershed stewardship groups, environmental organizations and individuals, and provided an opportunity to explore local watersheds and learn about water quality. The program was implemented in June 2005.

Continuing to partner with stakeholders will be key to moving forward on future education and outreach initiatives.

» *Cows and Fish, www.cowsandfish.org*
» *Inside Education visit: www.insideeducation.ca*
» *Alberta Water Quality Awareness Day: www.awqa.ca*

A good example of an educational partnership to build the capacity for watershed management is the Watershed Function and Climate Variability: Implications for Water Management workshop held on March 19, 2004. The workshop was hosted for members of the Battle River Advisory Group and the public. It was the first in a series of workshops to assist members in acquiring the information required to make effective water conservation objective recommendations within the Battle River Planning Process.

Members of the Battle River Advisory Group have committed a significant amount of time to attending educational workshops and sessions to ensure they have the information they need to make effective recommendations.

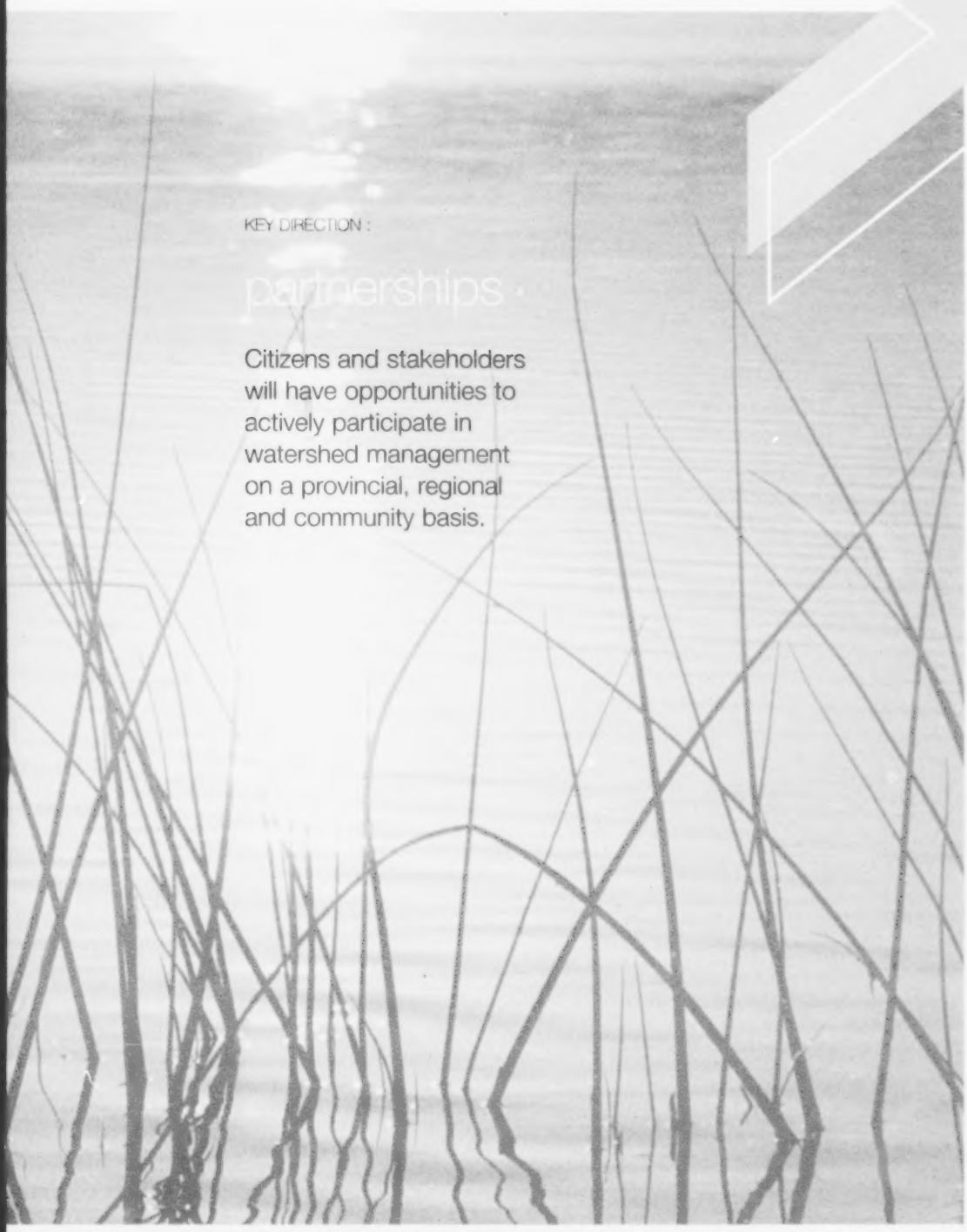
The Community Flood Risk Mapping performance measure assesses the number of flood risk mapping reports completed, and the number of flood risk maps available on Alberta Environment's website, for communities identified as having a flood risk. Flood risk mapping requires integration of the hydrological assessment of the flood risk, topographic data, historical flood records assessment, hydraulic modeling, and model mapping to terrain maps. This is followed by municipality review, consultation on designation, and community assistance (such as educational packages, information open houses, development of appropriate bylaws and other related activities).

The performance measure results for 2003-2004 and the targets for 2005 through 2008 are:

2003/04	*2005/06*	*2006/07*	*2007/08*
Reports: 34	Reports: 36	Reports: 38	Reports: 40
Websites: 35	Websites: 35	Websites: 37	Websites: 39

Additional measures and enhancements to this measure will be developed in partnership with the Alberta Water Council as part of the implementation of specific Water Strategy actions.

Additional information on surface and groundwater quantity is available on Alberta Environment's water website at www.gov.ab.ca/env/water/gwsw/quantity/index.cfm.



KEY DIRECTION :

partnerships

Citizens and stakeholders will have opportunities to actively participate in watershed management on a provincial, regional and community basis.

KEY DIRECTION :
COMMITMENT :

			in 2004/2005	in 2004/2005
short-term (2004/05-2006/07)	- Provincial partnerships for watershed management and stewardship are established.	- Complete a partnership framework, outlining the roles, responsibilities and relationships between government and its partners. (See Section 6.1.1.)	✓	✓
		- Establish the Alberta Water Council. (See Section 6.1.2.)	✓	✓
		- Establish Watershed Planning and Advisory Councils for the Milk, Oldman, Bow, Red Deer, Battle, North Saskatchewan, Cold Lake - Beaver River and Lesser Slave Lake watersheds. (See Section 6.1.3.)	✓	
		- Establish water conservation objectives for the South Saskatchewan River Basin. (See Section 6.1.5.)	✓	
		- Complete watershed management plans for the South Saskatchewan, Battle, Cold Lake Beaver River and Lesser Slave Lake watersheds. (See Section 6.1.5.)	✓	
medium-term (2007/08-2009/10)	- Community watershed partnerships are established and operating.	- Establish Watershed Planning and Advisory Councils for the Athabasca and Peace watersheds.		
		- Complete watershed management plans for the Milk, Oldman, Bow, Red Deer and North Saskatchewan watersheds.		
		- Support Watershed Stewardship Groups to improve the condition of local watersheds. (See Section 6.1.4.)	✓	
long-term (2010/11-2013/14)	- Communities are demonstrating leadership in watershed management.	- Complete watershed management plans for all major watersheds. (See Section 6.1.5.)	✓	
		- Establish an adaptive management system for identifying issues, gathering information, developing and implementing action plans, and evaluating management actions.		

Water for Life identifies three types of partnerships integral to achieving stewardship of our water resources: the Alberta Water Council; Watershed Planning and Advisory Councils; and Watershed Stewardship Groups. Each of these partnerships have different, but complementary roles. Each provides Albertans with an opportunity to participate in the planning and implementation of improved water and watershed management throughout the province on a provincial, regional, and community basis.

Focus in 2004-2005 was placed on establishing the Alberta Water Council and formalizing agreements with those Watershed Planning and Advisory Councils that were already functioning as watershed groups. Water management planning programs are currently being led by the provincial government. The objective is to transition this leadership to the Watershed Planning and Advisory Councils as they are established and become competent for this role. Involvement of stakeholders in education and outreach activities will be key to ensuring Albertans have the information and motivation required to adopt stewardship practices.

The main program initiatives of the partnerships component of the Water Strategy include:

- framework for partnerships and watershed planning;
- Alberta Water Council;
- Watershed Planning and Advisory Councils;
- Watershed Stewardship Groups; and
- watershed planning.

The partnerships and supporting initiatives are described below, along with key highlights regarding their implementation and progress.

It is important that all participants in the three partnerships identified understand their roles and responsibilities. This includes how funding and technical support is obtained. To achieve this understanding, a suite of framework documents and guidelines are being developed with partners. These documents will evolve as the partnerships grow and evolve.

Enabling Partnerships, A Framework in Support of Water for Life: Alberta's Strategy for Sustainability is complete. The updated *Framework for Water Management Planning* will be completed in 2005-2006.

The Alberta Water Council will oversee the overall implementation of *Water for Life*, provide policy advice to government, set priorities for water research, and consult with Albertans on water issues on an on-going basis.

The area of land that catches precipitation and drains it to a water body such as a marsh, lake, stream or river. Watersheds can range in size from a few hectares to thousands of square kilometres. Alberta has seven major watersheds:

- Hay River Basin
- Peace/Slave River Basin
- Athabasca River Basin
- Beaver River Basin
- North Saskatchewan River Basin
- South Saskatchewan River Basin
- Milk River Basin

The Alberta Water Coucil was established in 2004. It includes 25 members representing a broad cross-section of stakeholders. The Council has developed their terms of reference, operating procedures, and a communications plan. The Council is focusing on: stewardship of *Water for Life* implementation, water conservation targets, a provincial water research plan, and the wetland policy.

More information on the Alberta Water Council members and their initiatives is available online at www.waterforlife.gov.ab.ca/html/council.html.

3.1.2 Watershed Planning and Advisory Councils

Watershed Planning and Advisory Councils (WPACs) will involve communities and stakeholders in watershed management. These councils will lead watershed planning, develop best management practices, foster stewardship activities within the watershed, report on the state of the watershed, and educate users of the water resource.

Each Watershed Planning and Advisory Council is a stand-alone, incorporated society with a mandate for effective water management in its watershed. The provincial government is a partner and a member, working within the society to achieve the mandate of both the society and the government departments. This is the same for all partners on the councils.

In 2004-2005, funding was allocated to support and establish Watershed Planning and Advisory Councils. Councils are established for the Oldman, Bow, and North Saskatchewan watersheds. Support is also being provided to establish Watershed Planning and Advisory Councils for the Red Deer, Battle, Cold Lake–Beaver River, and Lesser Slave Lake watersheds. Preliminary discussions on Councils for the Athabasca and Milk watersheds have started. Discussions for the Peace and Hay watersheds have not yet begun.

In 2005, the Councils for the Bow and North Saskatchewan watersheds completed their state of the watershed reports, and the Oldman Watershed Council completed a report summarizing five years of water quality monitoring. The Mackenzie River Basin Board completed the State of the Aquatic Ecosystem Report for the entire Mackenzie watershed, which includes the Peace and Athabasca rivers in Alberta.

Environment Minister Guy Boutilier explains, "Water is Alberta's 'blue gold,' a precious resource. Watershed councils, like the North Saskatchewan Watershed Alliance, play a crucial role in this province. They support Alberta Environment's Water for Life strategy, designed to ensure Albertans continue to have access to safe and sustainable water supplies for years to come."

In 2005, the North Saskatchewan Watershed Alliance and the Bow River Basin Council released their state of the basin reports, titled State of the North Saskatchewan Watershed Report 2005 – A Foundation for Collaborative Watershed Management *and* Nurture, Renew, Protect: A Report on the State of the Bow River Basin, *respectively.*

These studies represent the first comprehensive watershed-wide reviews of this type the province. The North Saskatchewan River watershed received a "generally fair" grade of health. The Bow River Basin Council reports that improved treatment of wastewater discharged by municipalities and industry have improved water quality over the past few decades. According to both reports, human activities are the biggest single influence on the health of the watershed. Land use activities, wetland loss and the health of the critical vegetation lining rivers, lakes and creeks in the watershed impact water quality. Several areas for improvement were identified, along with recommendations to address these needs.

Information on the established Water Planning and Advisory Councils and their work is available online at:

- *Oldman Watershed Council, www.oldmanbasin.org*
- *Bow River Basin Council, www.brbc.ab.ca*
- *North Saskatchewan Watershed Alliance, www.nswa.ab.ca*

Additional information on other watershed planning groups is available at Alberta Environment's water website, www.gov.ab.ca/env/water/management/index.cfm.

Over 60 community-based Watershed Stewardship Groups have formed across the province. These groups are made up of volunteer citizens and are often supported by local municipalities, businesses, industries and non-governmental organizations. These groups are taking the initiative to protect their local creeks, streams, rivers and lakes.

Watershed Stewardship Groups play a vital role in water management by developing on-the-ground solutions, promoting best management practices, and providing education and awareness on water issues to watershed residents.

In 2004, funding was directed to support the purchase of water testing equipment and materials for the Watershed Stewardship Groups, including the development of the *Watershed Stewardship in Alberta: A Directory of Stewardship Groups, Support Agencies, and Resources*. The directory is available online at www.ab.stewardshipcanada.ca. Some financial support is currently provided by Alberta Agriculture, Food and Rural Development through their Alberta Environmentally Sustainable Agriculture program. Some technical and operating support is provided by Agriculture, Food and Rural Development and Alberta Environment through their core budgets.

The first Alberta Water Quality Awareness Day was June 5, 2005. This initiative was a partnership between government, industry and non-government organizations.

Participants were provided free test kits to learn about the water quality of any lake, stream or wetland of interest. The day built awareness of water resources through local monitoring of Alberta's surface waters. For more information, visit www.awqa.ca/AWQA/home/awqaIndex.asp.

A list of Watershed Stewardship Groups in Alberta and tools to support them are available online at www.albertawatersheds.org or www.ab.stewarshipcanada.ca.

6.1.2 Watershed Planning

Adopting a watershed approach is founded on the basis that Alberta's water resources must be managed within the capacity of individual watersheds and all Albertans must recognize there are limits to the available water supply.

One component of the watershed approach is watershed planning. *Water for Life* identifies that Watershed Planning and Advisory Councils will lead watershed planning, which will be integrated to include quantity, quality, ecosystem health, source protection, and land use impacts on water.

As watershed planning proceeds, two important shifts are occurring. First, there is a shift from water management (allocation) planning to watershed (water quality and land use impact) planning, and second, from government-led planning to planning led by the Watershed Planning and Advisory Councils. The South Saskatchewan River Basin Plan is being led by government, but has a strong stakeholder advisory committee process. The four advisory committees have submitted their recommendations to government, including recommendations regarding the balance between water conservation objectives and allocation. The recommendations are expected to be released in the fall of 2005. Water management planning, also being led by government, is currently taking place in the Battle, Cold Lake-Beaver River, and Lesser Slave Lake watersheds. The goal is to transfer these initiatives to the Watershed Planning and Advisory Councils as they are established, and to evolve these initiatives into integrated watershed planning.

6.2 Performance Measures

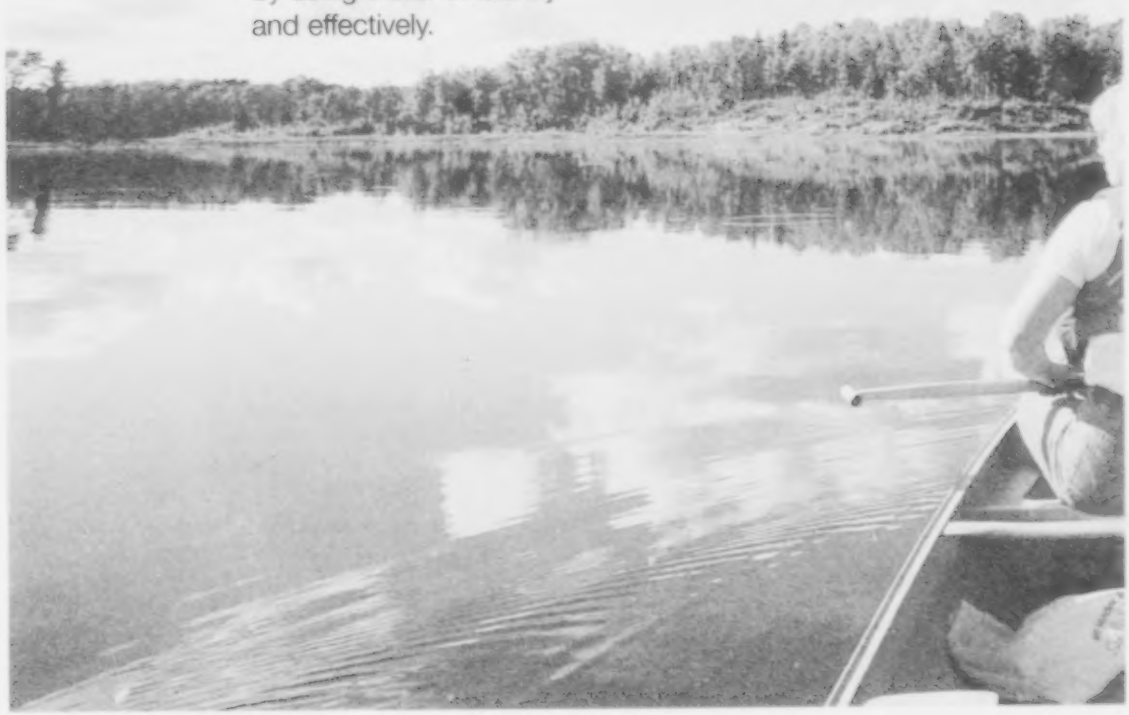
Specific performance measures have yet to be developed to monitor the effectiveness of Water Strategy partnership initiatives. Measures will be developed in partnership with the Alberta Water Council as part of the implementation of specific Water Strategy actions.

6.3 Additional Information

More information on watershed planning and management is available on Alberta Environment's water website at www.gov.ab.ca/env/water/management/index.cfm.

KEY DIRECTION

Albertans will be leaders in conservation by using water efficiently and effectively.



KEY DIRECTION :
COMMITMENT :

		✓	
		✓	
		✓	
		✓	

KEY DIRECTION :
COMMITMENT :

			in 2004/2005	in 2004/2005
short term (2004/05-2006/07)	- Albertans understand the value of water to its economy and quality of life.	- Establish a system to monitor and report actual water use by all sectors on an ongoing basis. (See Section 7.1.1.)	✓	
		- Determine and report on the true value of water in relation to the provincial economy.		
		- Complete an evaluation and make recommendations on the merit of economic instruments to meet water conservation and productivity objectives. (See Section 7.1.4.)	✓	
		- Establish a public education and awareness program on water conservation in Alberta. (See Section 7.1.2.)	✓	
medium-term (2007/08-2009/10)	- All sectors are demonstrating best management practices and improving efficiency and productivity associated with water use.	- Prepare water conservation and productivity plans for all water using sectors. (See Section 7.1.5.)	✓	
		- Implement economic instruments as necessary to meet water conservation and productivity objectives.		
long-term (2010/11-2013/14)	- The overall efficiency and productivity of water use in Alberta has improved by 30 percent from 2005 levels by 2015 (firm targets to be determined by the Alberta Water Council).	- Establish an ongoing monitoring program to ensure all sectors are achieving water conservation and productivity objectives.		

Historically, Albertans have enjoyed an abundance of water for economic and population growth; however, in recent years, water supply has become increasingly unpredictable due to fluctuations in annual precipitation and snowmelt. Increasing population and economic growth means the limit of available water has been reached or is being approached in a number of river basins. Without changes in how we use water, the capacity to sustain Alberta's economy and provide for its citizens could be limited.

Albertans can address this problem by increasing the ability to capture and store water during high flow periods ("supply side" management), and improving water use practices ("demand side" management) by improvements in efficiency and conservation.

Water for Life challenges Albertans to achieve an overall provincial target of a 30 per cent improvement in efficiency and productivity by 2015 (from a 2005 baseline). This target helps organizations focus on milestones while pursuing the overall outcome - to maintain a reliable, quality water supply for a sustainable economy. Firm targets will be determined in conjunction with the Alberta Water Council.

To improve our water use practices, we first need baseline information to provide a more complete understanding of what we use water for, how much is used, where and when water might be a limiting factor to growth, which economic instruments (and under what circumstances) offer the most benefit to improving efficiency and productivity and what best management practices are available or need further development to improve the use of water.

7.1 Key Program Initiatives

Key program initiatives included in the water conservation component of the strategy include:

- electronic water use reporting system;
- education program on water conservation;
- value of water in relation to the provincial economy;
- analysis of economic instruments and water conservation measures;
- water use practice and policy for various sectors; and
- implementing best management practices for agriculture.

These initiatives are described below, along with key highlights regarding their implementation and progress.

7.1.1 Water Use Data System

To effectively implement the target for water conservation and productivity, the Government of Alberta must be able to track actual water used by licence holders. Not all water allocated under a licence is diverted from the source. Water may be consumed, lost, recycled, stored, transferred, returned to a water body, or otherwise removed from the water basin for any given licenced operation. All of these variables need to be considered to set targets for water use efficiency and conservation to ensure reliable quality water for a

THE CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT DEFINES :

WATER CONSERVATION/ EFFICIENCY :

The use of any water conservation measure that results in: a beneficial reduction in water loss, water waste or use; or, accomplishment of a particular function, task or process using the minimum volume of water feasible, as compared to the volume of water delivered. The outcomes of water conservation/efficiency include: reducing demand; increasing water use productivity; conserving resources to maintain healthy aquatic ecosystems; maintaining or enhancing water quality.

WATER USE PRODUCTIVITY

Measuring the amount of water that must be expended to produce one unit of any good or service. In general, the lower the water input requirement per unit, the higher the efficiency.

sustainable economy. The Water Use Reporting Project, led by Alberta Environment in conjunction with Alberta Agriculture, Food and Rural development and the Alberta Energy and Utilities Board, is being undertaken to address these issues. The project will be conducted in multiple phases.

An electronic water use data collection system is anticipated to be operational late in the summer of 2005. The target for 2005-2006 is to have 80 per cent of the water allocation/use volumes, for each sector, for each basin, reported by fiscal year end. Approximately 2,000 licence holders will need to report to meet the 80 per cent target. The balance of the licence holders will be brought into the system in subsequent years. To get the greatest benefit as quickly as possible, irrigation districts, municipalities, and large industrial users will be initially targeted because they are large users of water and many of these users currently report water use information in paper format.

7.1.2 Education Program on Water Conservation

Alberta Environment is developing a Water Education Framework within which water conservation is identified as a key area for program development. Priority projects and activities will be identified through yearly work plans. Alberta Environment has water conservation information available on its website, and will continue to update this information. Partnerships are being established to make use of existing resources developed by others (e.g., City of Calgary Waterworks, EPCOR) that can be used on a provincial basis. A booklet on residential water use developed by the Canada Mortgage and Housing Corporation and a booklet on landscape water use recommended by Landscape Alberta Nursery Trades Association, were provided to all Alberta public libraries in the fall of 2004 as basic reference materials.

Copies of these publications are available at:

» CMHC, www.cmhc-schl.gc.ca/en/imquaf/himu/wacon/wacon_068.cfm
» LANTA, www.turfgrasssod.org/Water.pdf

Water conservation was the primary focus of Alberta Environment's Minister for the Day program in 2004. In this program, over 250 fifth grade students across Alberta investigated water conservation during regular class time and submitted entries outlining their thoughts to Alberta Environment. The top entries came to Edmonton to share their ideas with the Environment Minister. Activities included a tour of the Legislature, discussions with the Minister, a press conference, and investigation of wetlands.

Alberta Economic Development will lead the study to assess the value of water in relation to the provincial economy. The study will identify and determine the value of water to Alberta's economy, and identify where water might be a limiting factor to economic growth.

Economic instruments and conservation measures are used in Canada and elsewhere. An assessment will determine what instruments and measures could be effective in Alberta. The Canadian Council of Ministers of the Environment (CCME) and the Water Conservation and Economics Task Group have engaged consultants to prepare reports on an analysis of economic instruments and an analysis of water conservation measures. The reports will identify the most promising instruments and measures in use from national and international jurisdictions and will identify strategies for implementing them in Canada. These reports will provide valuable background information as Alberta moves forward with water conservation and considers the use of economic instruments to promote conservation.

This initiative includes the development of water conservation and productivity plans and the establishment of targets for improved efficiency for all water use sectors. In 2004-2005, focus was placed on reviewing oilfield use of water.

During the consultation process that led to the development of *Water for Life*, Albertans expressed concern about the underground injection of fresh water to enhance oil or bitumen recovery. Some Albertans, particularly those living in rural areas and small communities, were concerned that this practice represented a permanent loss of fresh water from the hydrologic cycle, and could reduce the amount of water available to other users.

In September 2003, the Minister of Environment established the Advisory Committee on Water Use Practice and Policy, involving representatives from industry, government, municipalities, and environmental groups, to examine the issue and help find a balanced

solution. The committee reviewed existing policies and practices and provided recommendations that could lead to the reduction or elimination of this type of water use. The Advisory Committee's final report was released to the public in October 2004, following a preliminary report, public consultation and further deliberations.

The Advisory Committee recommended a measured approach to achieving reductions in the underground injection of fresh water that places the highest priority on areas where water scarcity is, or is likely to become, a concern to other water users or to environmental sustainability. The Advisory Committee also recommended specific targets for underground injection be included in the overall Provincial Water Conservation Plan. The plan is to be developed by the Alberta Water Council, in co-operation with other sectors using water.

Additional information on the Advisory Committee and their recommendations is available on Alberta Environment's website at www.waterforlife.gov.ab.ca/html/removed.html#report.

7.1.6 Implementing Best Management Practices for Agriculture

Agricultural operations use water for many different purposes, including irrigation, and livestock production. Each use has its own unique set of agronomic and environmental factors that must be considered such as the stage of growth of the crop, the climatic conditions, etc. Best management practices developed to address specific crops and/or livestock requirements for water could be a powerful conservation tool. Alberta Agriculture, Food and Rural Development is the lead agency responsible for the development and transfer of information on best management practices to Alberta agricultural producers.

More information on Alberta's Environmentally Sustainable Agriculture Program can be found at www.agric.gov.ab.ca/sustain/aesaprog.html.

7.2 Performance Measures

A water use efficiency and productivity measure is under development to assist in monitoring the effectiveness of Water Strategy conservation initiatives. The performance measure will compare the amount of water used in relation to productivity and the amount of water used in relation to population and economic growth. Targets will be determined relative to a 2015 target of a 30 per cent improvement in efficiency and productivity over 2005 levels. Firm targets will be determined in conjunction with the Alberta Water Council.

Additional measures may also be developed in partnership with the Alberta Water Council as part of the implementation of specific Water Strategy actions.

7.3 Additional Information

Additional information on water conservation is available on Alberta Environment's water website at www.gov.ab.ca/env/water/Conservation/index.cfm.

water for life • implementation progress report • october 2006

ISBN No. 0-7785-4378-5 Pub. No. I/1005